American Cinematographer
International Journal of Motion Picture Photography and Production Techniques
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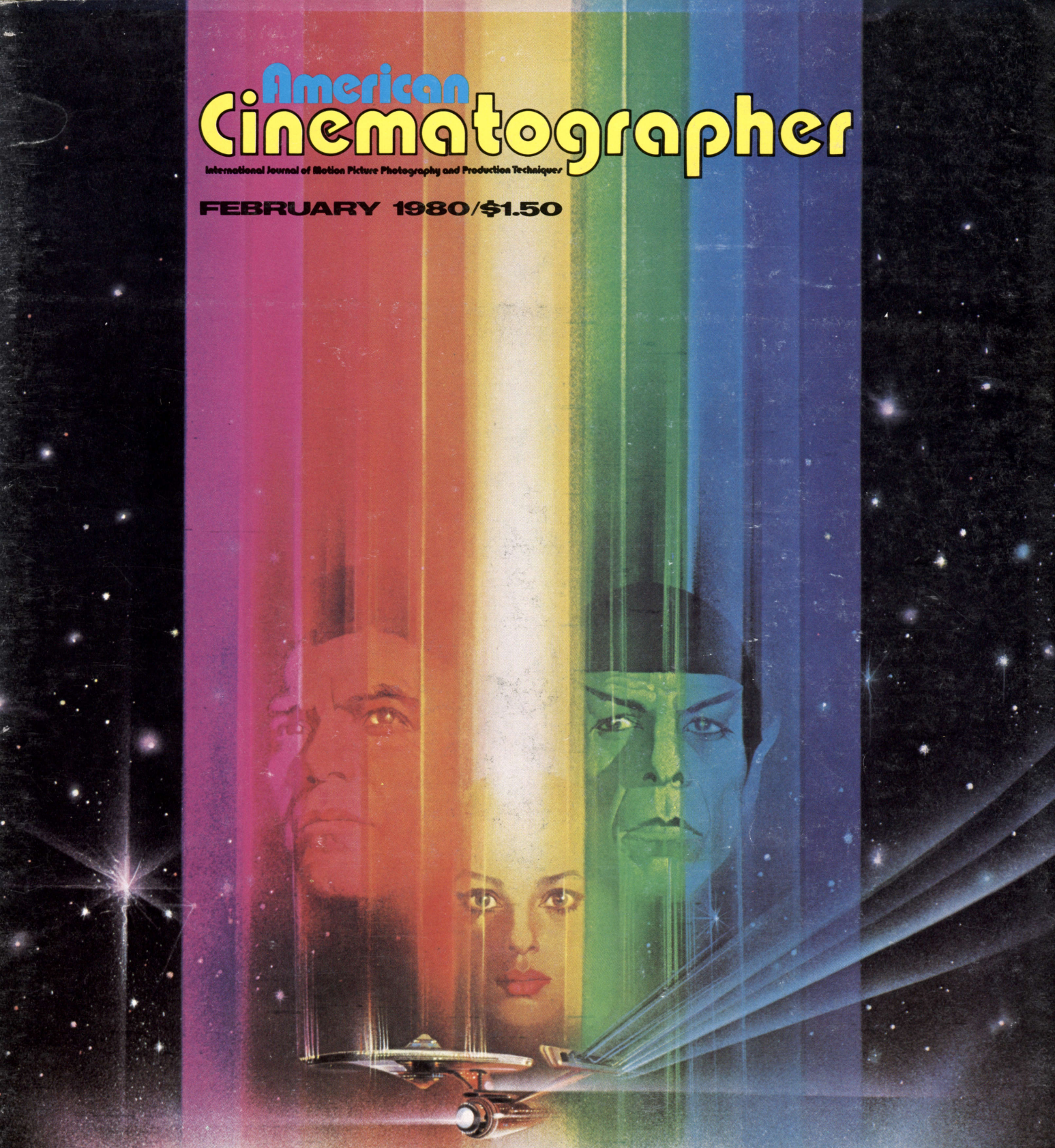

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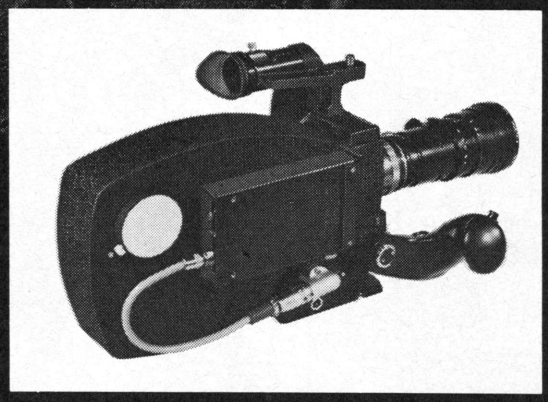

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American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initials A.S.C. after their names. A.S.C. membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.

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ON THE COVER: A posterized representation of the three central figures in STAR TREK—THE MOTION PICTURE, presented by Paramount Pictures, a Gene Roddenberry Production, a Robert Wise Film, photographed by Richard H. Kline, ASC. Artwork courtesy of Paramount Pictures.

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As our friends in the motion picture industry well know, concurrent with our development program for Steadicam — Cinema Products' Oscar-winning camera stabilizing system currently revolutionizing film and video production techniques all over the world — our design engineers took up another challenge, in many ways no less ambitious: GSMO.

Our aim was to provide the industry with a high-quality, sophisticated 16mm double system sound camera that would combine the basic design innovation pioneered by Eclair, namely, the quick-change cassette-type coaxial magazine, with Cinema Products' own innovative design contributions: the latest in crystal-controlled drive circuitry, on-board lightweight plug-in battery, studio-silent operation coupled with rugged modular construction that reduces downtime to a minimum, etc., etc.

And, of course, one of our major goals was to bring the GSMO in at roughly half the cost of sophisticated European imports such as the Arri 16SR and the Eclair ACL.

There are no shortcuts to design excellence. And living up to our own stringent standards was not easy.

GSMO took four years of painstaking research and development.

Plus a full year of extensive testing.

Our CP engineering staff carefully evaluated all inputs from the field, and made the required design changes.

The final result is that all of our design goals for GSMO have been successfully achieved. Some, beyond our original expectations!

Some fifty GSMO cameras — the initial production run — have already been used all over the world on actual filming assignments under the most rigorous field conditions.

I believe that GSMO is now the ideal state-of-the-art cassette-load production camera for all phases of 16mm cinematography, with a full range of sophisticated options and accessories for utmost versatility.

And GSMO is, unquestionably, the most *affordable* camera of its class available on the market today. Fully supported by Cinema Products' acclaimed after-sales factory backup, and a worldwide network of dealer service stations.

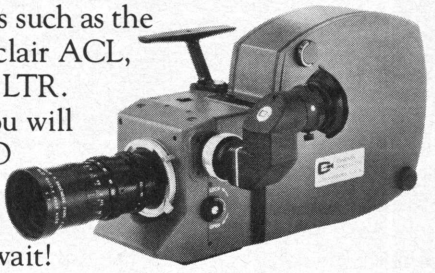
GSMO rental and demonstration cameras are now available for your evaluation at Cinema Products dealer showrooms all over the world. And customer back orders are being filled as rapidly as possible.

I urge you to visit your local CP dealer soon and check out the GSMO for yourself.

Test its outstanding performance.

Compare it — feature for feature, option for option, and price for price — against eminent European cameras such as the Arri 16SR, the Eclair ACL, and the Aaton 7 LTR.

I am sure you will agree that GSMO was well worth our effort. And well worth your wait!



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WHAT'S NEW

IN PRODUCTS, SERVICES AND LITERATURE

ALLEN TO PROVIDE FAST OLYMPIC PROCESSING

The Allen Products Company doesn't build things for skiing or skating—but Allen will be at the Winter Olympics as part of a team that will provide the fastest news film processing in the history of the games.

Two of Allen's new RVNP-82 quick turn-around film processors have been delivered to the immense Olympic Broadcast Center in Lake Placid. Designed to handle the new Rapid Video News Processing chemistry developed by Eastman Kodak Company, the Allen units will process the Olympic film twice as fast as was previously possible.

News film shot at the Olympics will be turned around in minutes for distribution throughout the world.

•

NEW TRIPOD SYSTEM OFFERS MAXIMUM VERSATILITY

Peter Lisand Machine Corp's new MODULAR 3 basic tripod system can be changed in less than a minute from full size to adjustable Hi-Hat. With the optionally available short legs, the MODULAR 3 system gives the cinematographer a full range of adjustment down to as low as 3" in the Hi-Hat version.

For extra support, the Spider Assembly is available, which can be removed in seconds if required by pulling out three pins. The Spider is fully adjustable so that the tripod legs can be spread to any convenient spacing.

The full size MODULAR 3 weighs only 9½ lbs. (10½ lbs. with the Spider attached). This makes for one of the lightest tripods available.

Additionally, delrin bushings are uitilized so there is no metal-to-metal contact in the tripod legs. Models are available to accept any of the standard camera heads. For further information: Peter Lisand Machine Corp., 352 River Road, Edgewater, N.J. 07020 / (201) 943-5600.

•

MOBILE ELECTRIC POWER STATIONS FOR MOVIE/TV LIGHTING

AMP-VAN is the name assigned to a new series of mobile electric power generating stations designed to meet on-location production requirements for motion picture and TV lighting. Electrical output matches the stringent requirements of HMI lighting systems, and the entire package is sound-attenuated to meet City of Chicago and similar noise codes. They are available with continuous duty ratings of 150, 300, 550 and 700 amps. Systems of greater output employing AMP-VAN concepts are available in trailer, truck and container configurations.

For further information contact Loren Mages, Forces, Inc., P.O. Box 696, Hillside, Il. 60162; (312) 547-5200.

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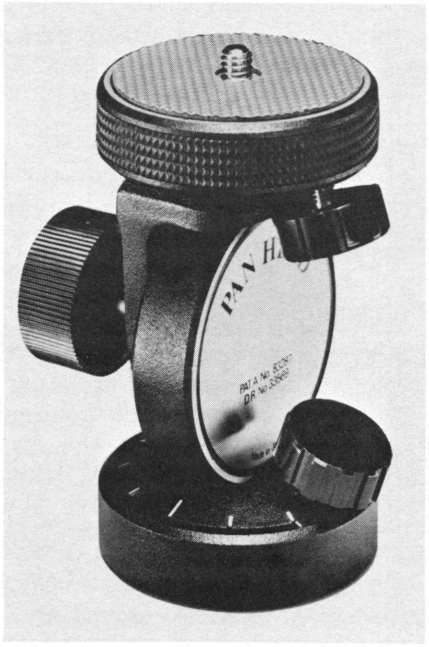

NEW PAN HEAD FROM HERVIC CORPORATION

Hervic Corporation, Van Nuys, Calif., is now distributing the Hervic Pan Head.

The solidly constructed unit is brand new and is ideal for both the amateur or professional cinematographer who needs a universal pan head for superior cinematography effects.

Even the lowliest tripod can become a device for achieving smooth-as-silk pans and tilts with a 35mm camera or 8mm and 16mm movie camera.

The Hervic pan head can be easily attached to any standard tripod—thereby turning even the cheapest tripod into a "pro" piece of gear.

The pan head provides a graduated angle on the horizontal and vertical planes and can be panned or tilted for smooth, flawless camera movements. The standard head screw can be affixed to virtually any camera.

Available at selected camera dealers, the Hervic pan head is distributed by Hervic Corp., 6910 Hayvenhurst Ave., Van Nuys, CA 91406. Telephone: (213) 781-1692.

The unit measures 3½" high and has a diameter of approximately 2¼".

Suggested list price for the pan head is $27.95.

•

SMPTE/PMPEA WORKING GROUP FOR STUDIO LIGHTING HARDWARE STANDARDIZATION

The SMPTE/PMPEA Working Group for Studio Lighting Hardware Standardization met during the 121st SMPTE Technical Conference in Los Angeles. Chairperson Ed Phillips reported a light response to the recent survey distributed by the SLHS Group. The survey requested input from manufacturers, dealers and users of motion picture and television lighting equipment with respect to recommending standardization of diameter and nomenclature of the "Baby Pin". Phillips reported the 5/8" diameter was favored among those responding.

Continuing to pursue a recommended standard, the Working Group will draft a proposed standard of the "Baby Pin" and "Junior Stud", to present to manufacturers and users of motion picture and television lighting hardware for comment.

Working on this subject in an international scope as well, the Group will also translate the proposed German Standard and obtain the French Standard for review during the next SLHS Working Group meeting.

The SMPTE/PMPEA Working Group will announce a meeting to be scheduled during the National Association of Broadcasters Convention in Las Vegas. Meetings of the Group are open to all interested parties regardless of Society affiliation.

Further details of the Group's work may be obtained by contacting the PMPEA National Headquarters, University Tower, Suite 806, 6440 N. Central Expressway, Dallas, TX 75206; (214) 696-1448 or Ed Phillips, Chairperson of the Group, Matthews Studio Equipment, Inc., 2405 Empire Ave., Burbank, CA 91504; (213) 462-2233. ■

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ROCK STEADY PICTURES NO MATTER HOW UNSTEADY THE SHOOTING PLATFORM

Picture quality obtained with Dynalens, either hand-held or mounted, surpasses even the standards of the most meticulous cameraman. Dynalens makes possible trackless dolly shots, rock-steady insert car pictures, steady, vibrationless hand-held shots either standing, walking or from any type of vehicle. With Dynalens, any camera operator can produce remarkable aerial shots from a plane or helicopter.

Basically, this revolutionary lens system employs stabilizing gyros that sense camera movement and produce electrical energy which, in turn, moves a correcting lens in the opposite direction to the movement. Picture unsteadiness is gone. From 35mm "flat" format to anamorphic "wide screen," from TV format to 16mm cameras, from still cameras to telescopes, Dynalens has the flexibility to work with them all.

CAN BE USED WITH WIDE ANGLE LENSES

No optical image stabilizing system other than DYNALENS enables the cameraman to use wide angle lenses such as 35mm in 35 format and 12mm in 16 format. Since Dynalens does not incorporate prisms or mirrors, it does not degrade image quality.

DYNALENS has no focal length, no exposure compensation and no loss of resolution.

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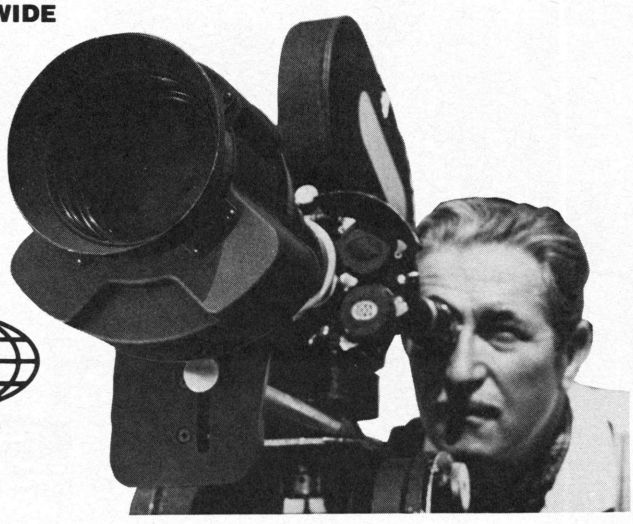

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To fully appreciate this accomplishment, consider the imperatives of professional filmmaking. And how superbly the EBM serves them.

The First Imperative: Effortless Handling. The photo shows a fully equipped yet perfectly handheld camera—from its one-amp battery in the pistol grip to its unbelievable 16-100mm f/1.9 Vario Switar automatic power zoom lens with built-in light meter. Total weight of this rugged, ready-to-roam package? An incredible 12½ lbs.

The Second Imperative: Uncompromising Performance. All the essentials for professional results are gathered here: chronometer accurate electric film drive, suitable for synchronized sound with your choice of crystal or sync pulse generator. A diaphragm presetting device that lets you focus and frame with full light coming into the flickerless reflex viewfinder. And all the other niceties that help you refine your technique and your results, including: variable speeds from 10 to 50 fps, built-in filter slot, automatic threading and full rewind.

The Third Imperative: Adaptability. With its positive-locking large bayonet mount and optional C-mount adapter, you can attach virtually any lens to your Bolex EBM. And for stability under all shooting conditions, choose among our versatile tripod, precision-machined monopod, or shoulder brace.

There are two power supplies available for the Bolex EBM—as much power as you'll ever need for continuous studio or on-location shooting. And with the easy clip-on 400 ft. magazine, your film capacity is sure to measure up to all your shooting requirements.

The Final Imperative: Affordability. When we say that you can rig up a quite complete system for less than half the price of other high quality 16mm cameras, you may be astonished. So initially were the many pros who have since discovered that they needn't spend a fortune to own a system which can help them build one.

We urge you to inspect the Bolex EBM carefully before you purchase any other camera. And set the perfection of Swiss movement into motion for you. **Bolex...First in sixteen.**

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—Mitchell W. Block
Direct Cinema Limited

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"Our newest film 'Speeding?' was shot in 16mm in Los Angeles. As you know, shooting in cars and outside with high lighting ratios creates problems when you are using 7247. TVC did all the dailies, processing and release printing. And everything looked great.

"We've been using TVC for ten years. When we moved to Los Angeles from New York five years ago, there was no reason to change labs, too; TVC turns my dailies back within 48 hours. And, if there are any problems, they're on the phone first thing in the morning.

"TVC does all our processing, work printing, and release printing—thousands and thousands of feet. It may cost a little more—but it's worth it. After all, you get what you pay for.

"When Direct Cinema Limited has a choice of labs for its distribution printing in 16mm, TVC, even though they're in New York, gets the job.

"When you can't afford to worry about release print quality, you can't afford to trust any one else."

—Mitchell W. Block
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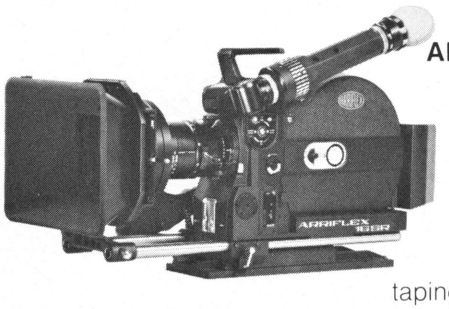
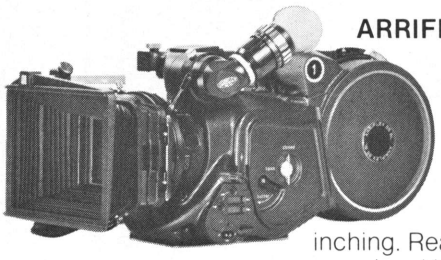


ARRIFLEX 16SR A completely new 16mm reflex design with motor built into camera base for better balance and silent running. Lightweight unit accepts 400' instant-change magazine; onboard or outboard batteries. Has video tap for optional simultaneous taping and/or monitoring, thru-lens meter, crystal control, optional variable speed, auto servo exposure, 5-way rotational finder, much more. 50/60 Hz, 24/25 fps.



ARRIFLEX 35BL Silent, shoulder-balanced 35 lets you shoot sync sound on location to eliminate looping! Accepts video eyepiece for thru-lens taping/monitoring. Brilliant finder image shows entire silent aperture to eliminate mirror inching. Rear-mounted, quick-change 400' magazine. Hi-power battery drives 1600' of film per charge, even in cold weather. Crystal sync for 50/60 Hz, 24/25 fps.

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THE BOOKSHELF

By GEORGE L. GEORGE

ASPECTS OF CINEMA

In the lavishly illustrated, large format THE WARNER BROS. STORY, Clive Hirschhorn surveys the progress since 1918 of this enduring studio. Every film the studio made or distributed is included with synopsis, cast and direction, critical assessments, as well as an appraisal of its basic contributions to cinema art and technique (Crown $30).

Another Hollywood institution is celebrated in Valerie Childs's THE MAGIC OF DISNEYLAND AND WALT DISNEY WORLD. This pictorial adventure takes us through the popular California and Florida amusement parks, where such attractions as Fantasyland, the Magic Kingdom and other imaginative environments perpetuate Disney's enterprising spirit (Mayflower $8.98).

How wartime America influenced and was, in turn, influenced by films of the 1939-52 period is knowledgeably discussed by British scholar Colin Schindler in HOLLYWOOD GOES TO WAR. Covering a wide range of movies, Schindler stresses the cross-pollination between reality and its screen representation with many specific examples from familiar movies (Routledge & Kegan Paul $20).

A complete record of last year's Oscar festivities is detailed in ACADEMY AWARDS 1979 OSCAR ANNUAL, an attractive yearly publication edited by Martin M. Cooper. A running narrative of the proceedings is followed by the inside story of the event's technical production, and an extensive survey of winners and nominees. This is the 7th volume in a valuable series (ESE Califronia, 509 N. Harbor Blvd., La Habra, CA 90631; $14.95/9.95).

In FORGOTTEN HORRORS, George E. Turner and Michael H. Price survey "poverty row" production of the 1929-36 period that mined the rich gore-and-mystery vein. These may have been shoestring films, but their budgets' modesty was well compensated by ingenious inventiveness (Barnes $19.95).

★ ★ ★

GENRES AND TECHNIQUES

The guiding ideological lines during the formative years of Soviet films is explored in a well-documented book, THE POLITICS OF THE SOVIET CINEMA 1917-1929. Author Richard Taylor finds that the social turbulence resulting from the 1917 Revolution impeded the movie industry's organizational process, which was achieved by the end of the decade only at the cost of artistic integrity (Cambridge U. Press $19.95).

M. Ali Issari and Doris A. Paul examine, in WHAT IS CINEMA VERITE?, a documentary style that sought to capture on film the essence of life without staging or re-enacting real events. It discusses such practitioners as Soviet filmmaker Dziga Vertov, the Frenchman Jean Rouch and the American Maysles brothers. The book, however, fails inexplicably to mention Stephen Mamber's pioneer study of the subject, CINEMA VERITE, published in 1974 by MIT (Scarecrow Press $10.50).

Comprehensive, well-researched and literate, THE FILM ENCYCLOPEDIA is a massive 1200-page volume by Ephraim Katz. It surveys every aspect of cinema in over 7000 entries covering personalities, esthetics and techniques, places and events, history and industry. This is an eminently useful, reliable reference and research tool, one of the very best of its type (Crowell $29.95).

The contribution of directors Altman, Coppola, Kubrick, Penn and Scorsese to a new approach in film format and content is assessed by Robert Phillip Kolker in a stimulating volume, A CINEMA OF LONELINESS. The author argues convincingly that the isolation from and the fight against established economic and artistic dogma often resulted in films that reflect society's current uncertainties and fears (Oxford U. Press $15.95).

Economic realities of the film industry are soundly discussed by Mollie Gregory, an experienced producer, consultant and lecturer, in MAKING FILMS YOUR BUSINESS. Financing of features or documentaries, distribution in theaters or on TV, legal aspects, all are subjects competently and explicitly covered in this practical text (Schocken Press $6.95).

A new brochure from Eastman Kodak provides a comprehensive source of technical information: A GUIDE FOR PROCESSING BLACK-&-WHITE MOTION PICTURE FILMS covers expertly and in easy-to-read style the various stages of the procedure, the chemicals and equipment used, and the handling and storing facilities. A useful text for both the professional and advanced non-pro (Publication No. H-7; $5.95).

Edited by Raymond Fielding, A TECHNOLOGICAL HISTORY OF MOTION PICTURES AND TELEVISION is a reprint of an important volume first published in 1967. It consists of excerpts from The Journal of the Society of Motion Picture and Television Engineers that mark milestones in the development of these twin fields. Personal reminiscences, technological progress in cinematography, film stock, laboratory procedures and sound recording are culled from the pages of the Journal as far back as 1920 (U. of California Press $25).

★ ★ ★

MARKETING "STAR TREK"

The exploitation of *Star Trek—The Motion Picture* goes far beyond the usual intensive exhibition drive. While tie-ins, such as the publishing of books related to particular movies at the time of their release are quite widespread these days, it is the first time that some 20 publications are scheduled to cash in on a film's popular appeal.

This is what has been accomplished by Pocket Books, a subsidiary of Simon & Schuster. The following volumes are currently available in book stores: STAR TREK—THE MOTION PICTURE, a novelization by creator/producer Gene Roddenberry ($2.50); STAR TREK SPACEFLIGHT CHRONOLOGY by Stan & Fred Goldstein and Rick Sternbach, covering Star Trek voyages into the 23rd century ($8.95); STAR TREK SPEAKS by Susan Sackett and Fred & Stan Goldstein, recording crew members' thoughts ($2.95).

Books yet to be published include THE MAKING OF STAR TREK—THE MOTION PICTURE ($14.95/7.95); STAR TREK—THE MOTION PICTURE, a photo-novel ($2.95); CHEKOV'S ENTERPRISE, the Star Trek Lieutenant's story ($1.95); THE MONSTERS OF STAR TREK, about space creatures ($1.75); THE OFFICIAL STAR TREK TRIVIA BOOK containing assorted data ($1.95); OFFICIAL BLUEPRINTS FROM STAR TREK—THE MOTION PICTURE, with 14 plans of spaceships ($6.95).

In addition, many "non-books" are available to Star Trek fans, including pop-up, punch-out, peel-off, make-a-game, and make-your-own costume publications, plus wall and desk calendars. All are priced from $4.95 to $10.95. ■

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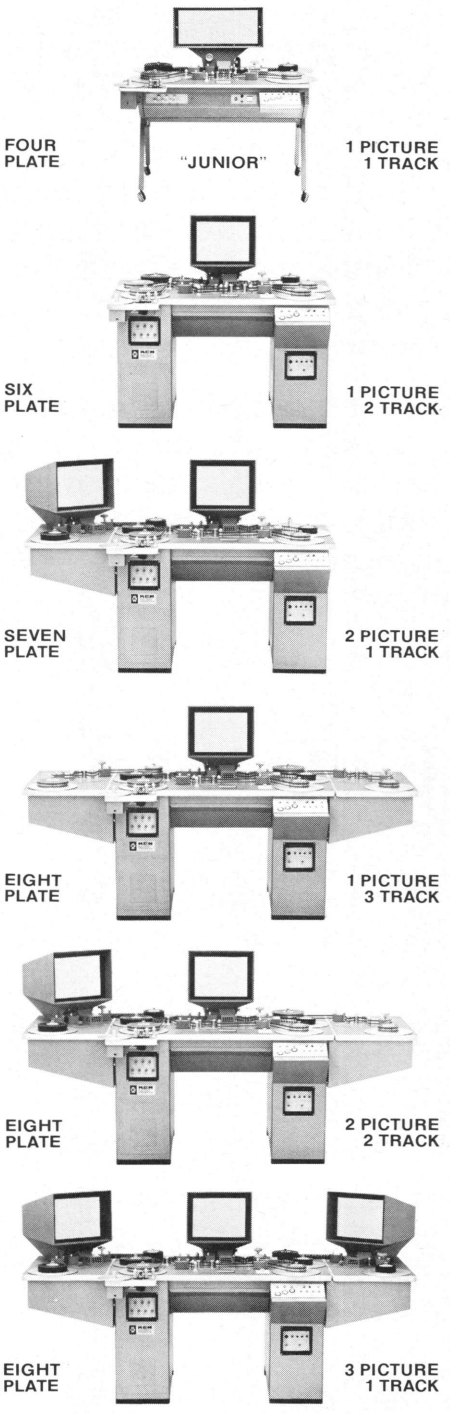

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Comfortable to hold...

In terms of image sharpness, it is a known fact that film cameras, be they 16 or 35 mm, have a distinct advantage over video cameras. The balance also weighs in favour of film cameras when it comes to freedom of movement and **independence.** The **Aäton** goes a step farther with its invention of clear time marking : assuring absolute sync to the sound recordist even if he is out of sight, and enormously facilitating editing.

To turn these advantages of film to account, however, the camera must be easy to hold, comfortable — in short it has to fit. That is why the Aäton LTR 16 mm camera has its characteristic overall shape with a good chunk cut out for the cameraman's shoulder. And the viewfinder is placed so as to allow easy viewing without fatigue. The camera is so comfortable to hold that the cameraman tends to keep it on his shoulder between shots; it is a pleasant companion.

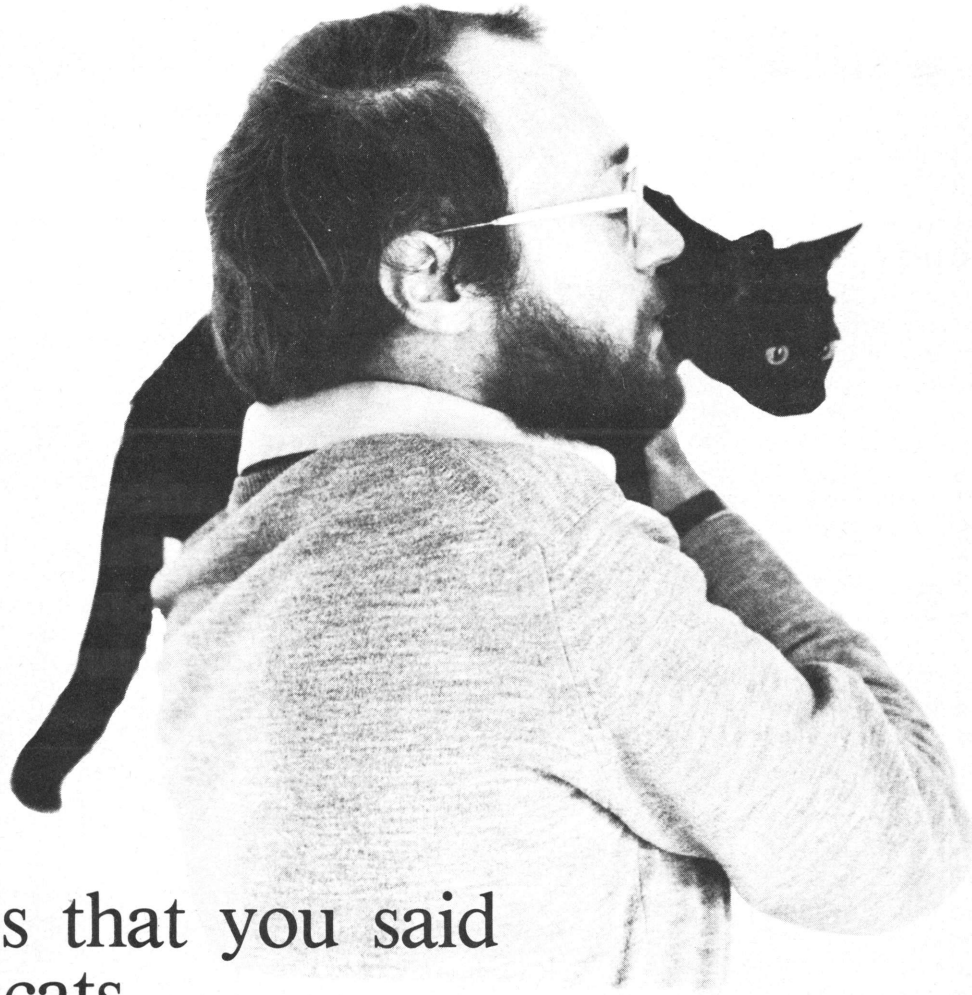
Cats don't bark...

The Aäton LTR was designed to be **quiet**. It is driven by a brushless motor directly linked to the claw movement; power transmission is by high technology gears — no noisy belts. As the film is flat and smooth while it moves over the aperture plate, it doesn't need strong rear pressure to hold it in place. This means the claw can move in and out of the perfs under low accelaration; there is no consequent generation of noise during pull-down.

The noise level of the LTR is in the area of 26 dBA. And with ageing, it tends to become quieter; very often users find that after a year's use, the camera goes down to 23 and 24 dB. ***That is quiet***.

32 **29** **26** **23** **20**

It is worth noting that sound measurements are made on a logarithmic scale; 29 dB is half as noisy as 32 dB, and 4 times noisier than 23 dB.



Q : What's that you said
about cats
and the Aäton ?
A : Cats catch mice,
Aätons don't.
Q : Then what are these
two pictures for ?
A : To show what cats
and Aätons have
in common : both
comfortable to hold,
and very quiet.

CINEMA WORKSHOP

By ANTON WILSON

BACK-FOCUS II

There are actually three back-focus distances on a professional video camera. The prism behind the lens splits the lens image into three parts, directing each to the red, green, and blue tubes respectively. Each of these tubes must be precisely located to insure that the target of the tube is exactly in its respective image plane. The problem of one tube being out of position relative to the others cannot be rectified by adjusting the lens back-focus, as this will obviously affect all three tubes simultaneously. In the shop, the technician first adjusts the lens back-focus to the green tube *alone*. If the red or blue tubes are not properly aligned at this point, they are brought into the correct image plane by physically moving the problem tube in or out in its mount. This procedure is quite hairy and time-consuming and the entire camera must be realigned and registered after the tube(s) are repositioned. A cameraman should never attempt to reposition a tube or loosen a tube mount, especially in the field.

On one hand I am emphatically discouraging a cameraman from ever physically adjusting the pick-up tubes of his camera; on the other hand, I feel very strongly that a cameraman should know how to evaluate the performance of his camera to insure optimum image quality. The following is a method designed to enable the cameraman to check the back-focus alignment of all three tubes without any special tools or equipment. If the results of the test indicate a misalignment, the camera should be turned over to an engineer for realignment. The cameraman should not attempt to rectify the problem himself.

The test begins with the identical set-up as previously described in "Back-Focus I", with one additional step. As before, the focus chart should be placed at the minimum focusing distance of the lens. The lens *must* be *wide open* (maximum aperture). A sharp focus should be pulled at telephoto and then the lens must be zoomed to the extreme wide angle position (minimum focal length). The additional step requires a viewfinder (or monitor) be fed with the output of the green tube only. On most cameras this is quite easy to accomplish.

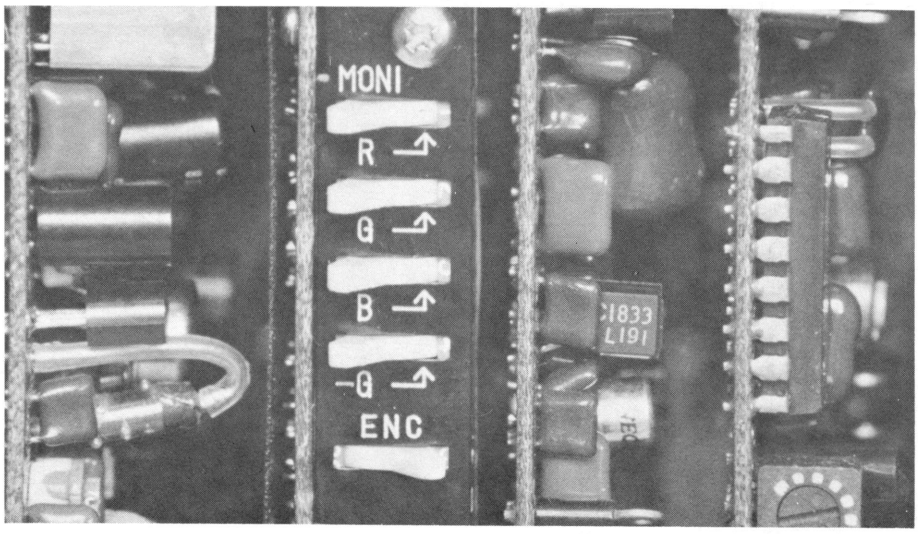
There are usually a set of switches either internally or externally located that control the signal to the viewfinder and a monitor output. For example, FIGURE I illustrates the group of switches found inside the Ikegami HL-79A. The photo shows the bottom "ENC" switch in the right hand (on) position and all others in the left (off) position. This is the normal condition providing a fully color encoded signal to the viewfinder and monitor. For the purpose of "step 1" of this test, the encoder must be switched off and the green output only switched on ("G" switch, second from the top, in the right position—all others in the left position.)

As with the standard back-focus test, note should be made of the back-focus indexes on the lens before the test begins. It would help to put a piece of camera tape along the back-focus ring in the manner of a pull-focus index. The back-focus ring lock is now loosened and the back-focus ring is rocked back and forth to achieve the sharpest focus of the chart target. Repeat this procedure several times noting the resting point for each attempt to determine the optimum focus point. Make a mark on the back-focus ring tape to indicate that best focus. Identify the mark with a "G".

Now turn off the output of the green tube and turn on the red tube ("R" switch) only. Repeat the above procedure. Determine the best focus and make a mark on the tape identified with an "R". Likewise, repeat the entire procedure with only the blue ("B" switch) on. If the camera was properly adjusted, the point of best focus for all three tubes would have been identical. Specifically, the point of best focus for the blue and red tests should have resulted in the mark made in step 1 being perfectly aligned with the index. If this is indeed the case, lock up the back-focus ring knowing the back-focus of all three tubes is optimum. If, however, there is more than a very slight shift between the three best focus marks, the camera should be turned over to an engineer with a note describing the results of your test, or better yet, leave the marked tape on the back focus ring.

If the camera must be used in the interim, the best compromise back-focus adjustment should be established. This is done by turning the encoder ("ENC") switch back on and determining the sharpest setting of the back-focus ring. This usually requires averaging repeated attempts to zero in on the best setting. If the three results of the tests are quite different from each other, the largest apertures and shortest focal lengths should be avoided especially in combination, i.e., short focal length at wide aperture. ■

FIGURE 1—These switches located inside an Ikegami HL-79A are typical of most ENG/EFP cameras. They allow the viewfinder and/or monitor to selectively view the outputs of the red, green, and blue channels either individually or in any combination. The bottom switch defeats all of the above switches and provides a fully color-encoded signal to the viewfinder/minitor. These switches can help the cameraman determine if the back-focus positions of all three color channels are in the same plane.



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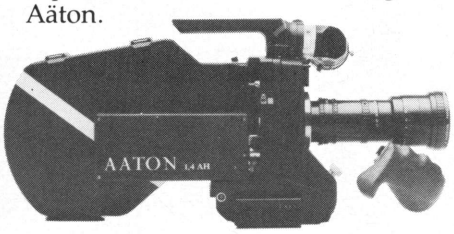

Les Zellan has been instrumental in making the overwhelming majority of LTR 16mm Aäton sales concluded in the U.S. (Some while on the staff of another distributor.) He discovered the special features which have made the Aäton the number one choice among European cameramen. And began introducing the cameras to such American cinematographers as "60 Minutes" regulars Greg Cooke, Chuck Levey and Bob Peterson.

Like them, you owe it to yourself to consider the Aäton when *you're* shopping for a 16mm camera. And when you do, why not come to the only distributor who features the Aäton *exclusively*? That's right. Zellan Enterprises had such faith in Aäton's engineering and design that they bet their whole future on the LTR. And that's why Aäton is the only product Zellan distributes.

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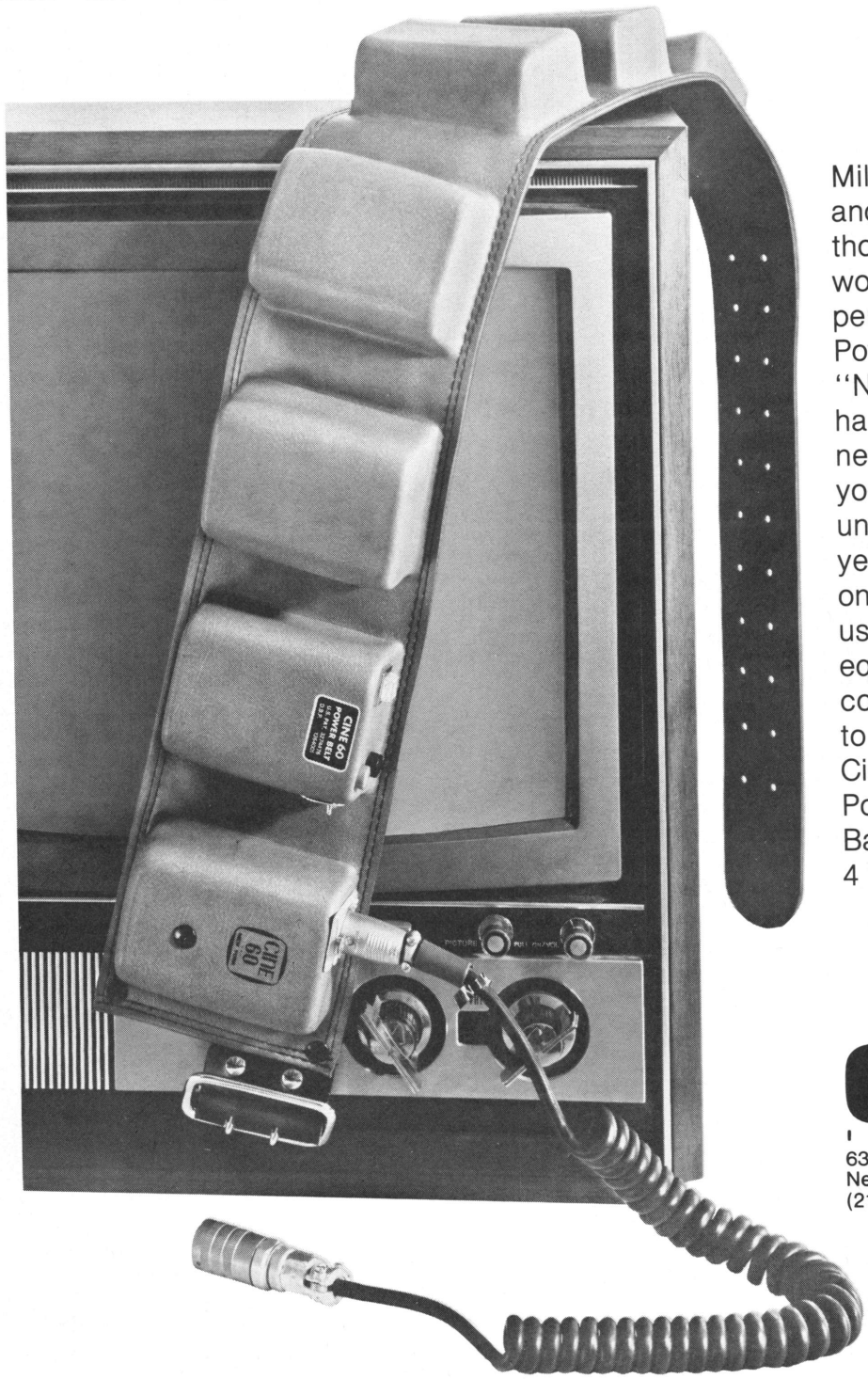

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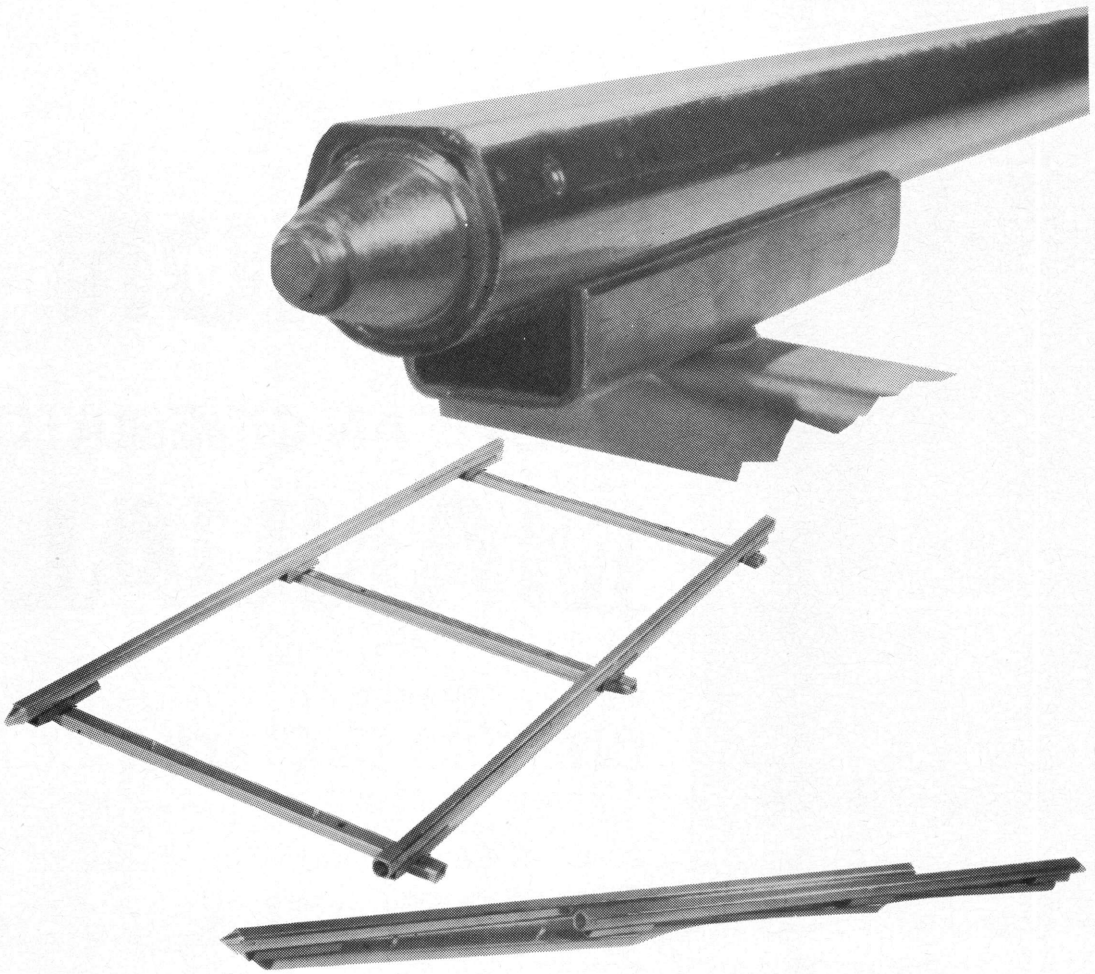

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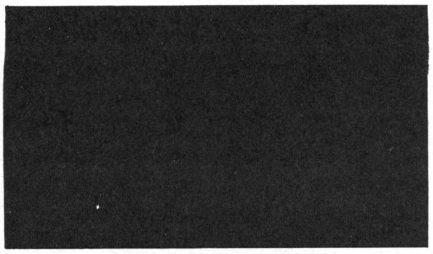

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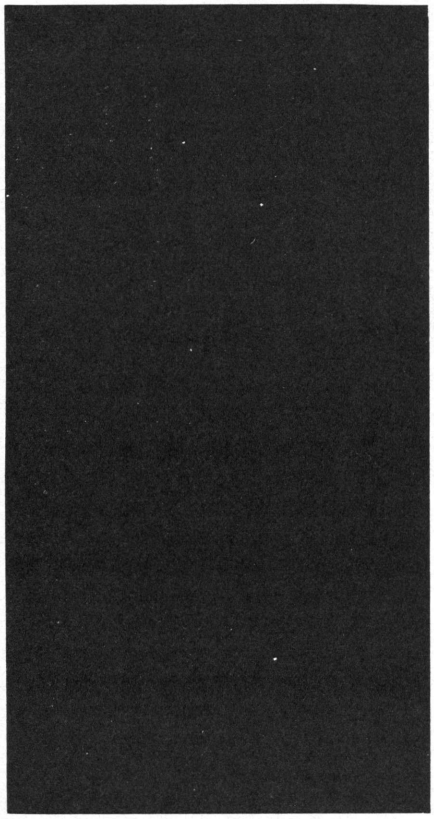

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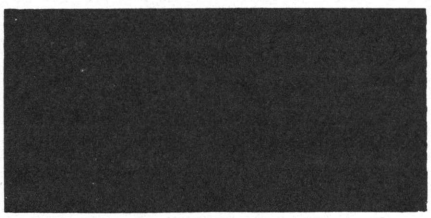

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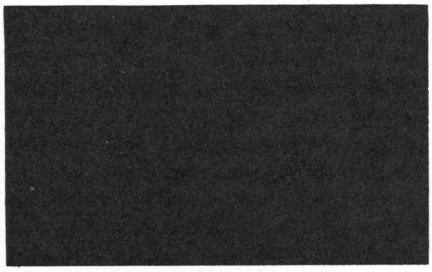

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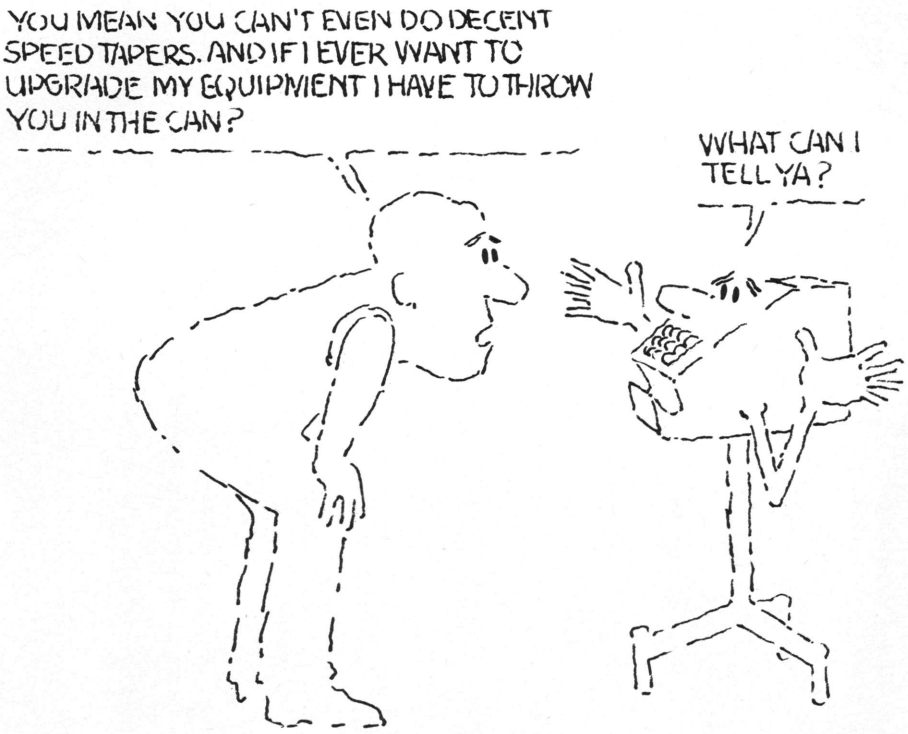
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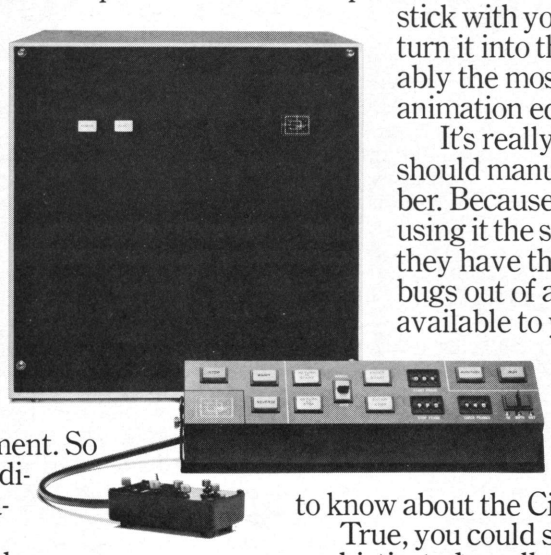

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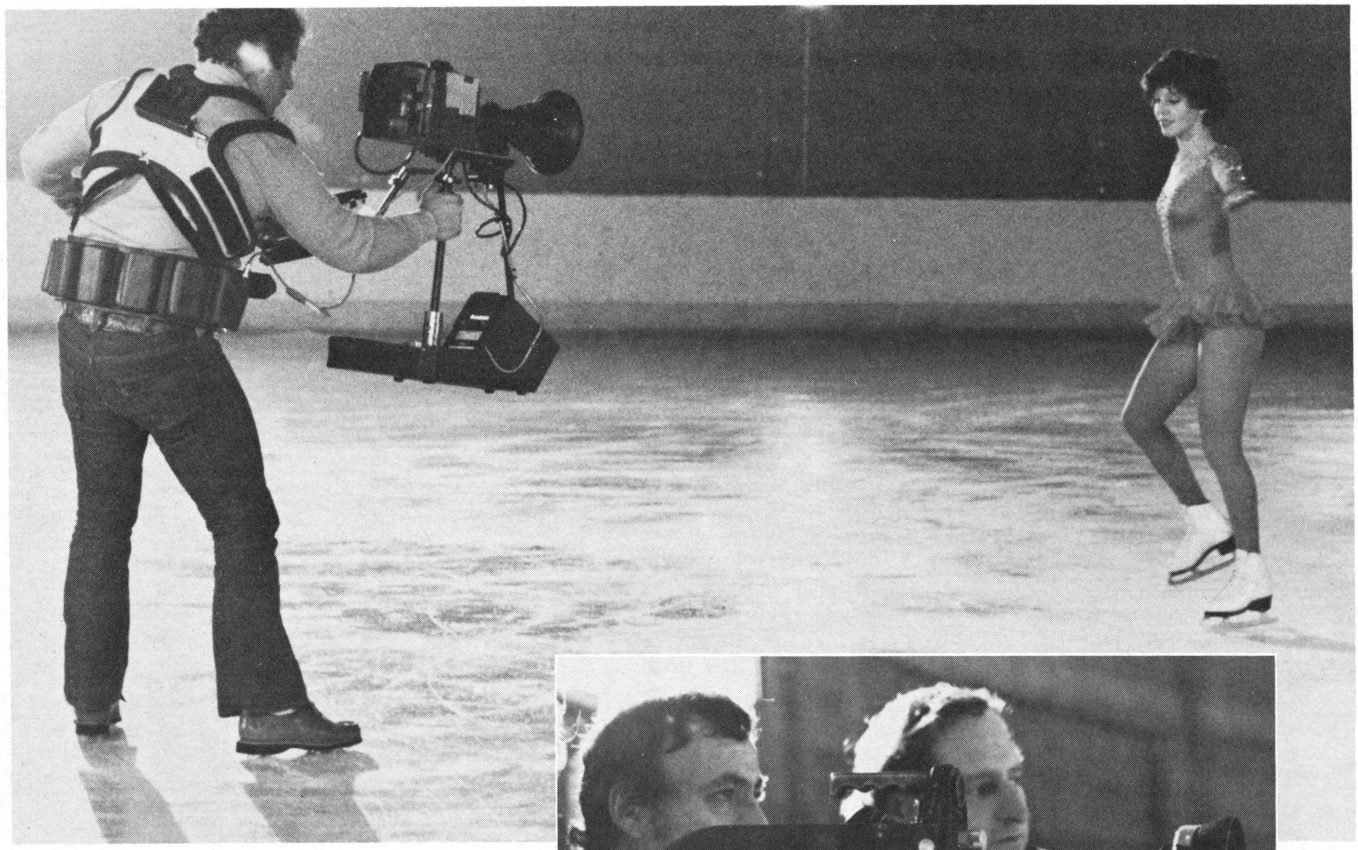
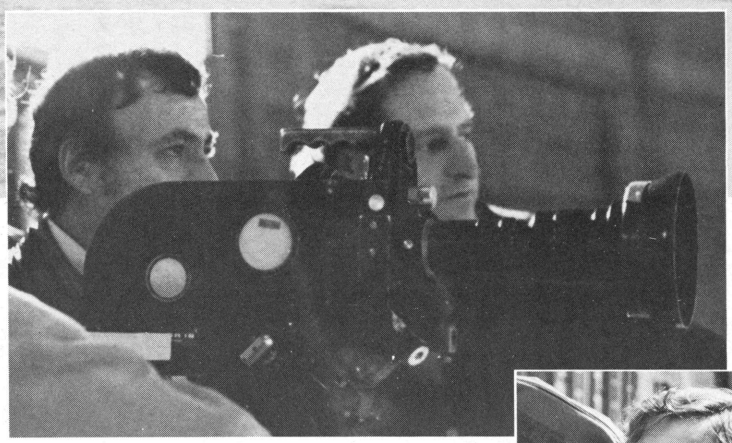
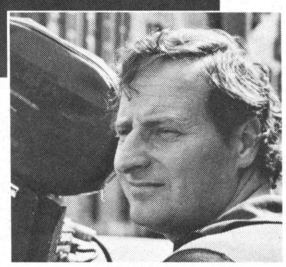




Filming the 1980 Winter Olympics: Award-Winning Cinematographer DON SHAPIRO



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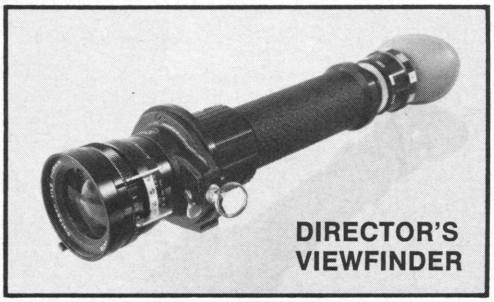

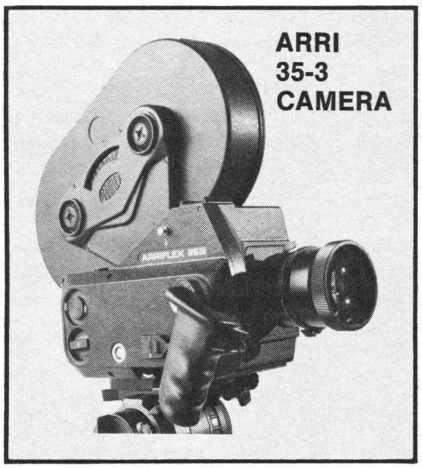

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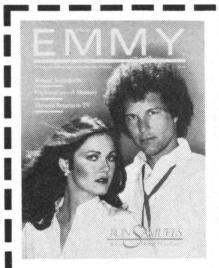

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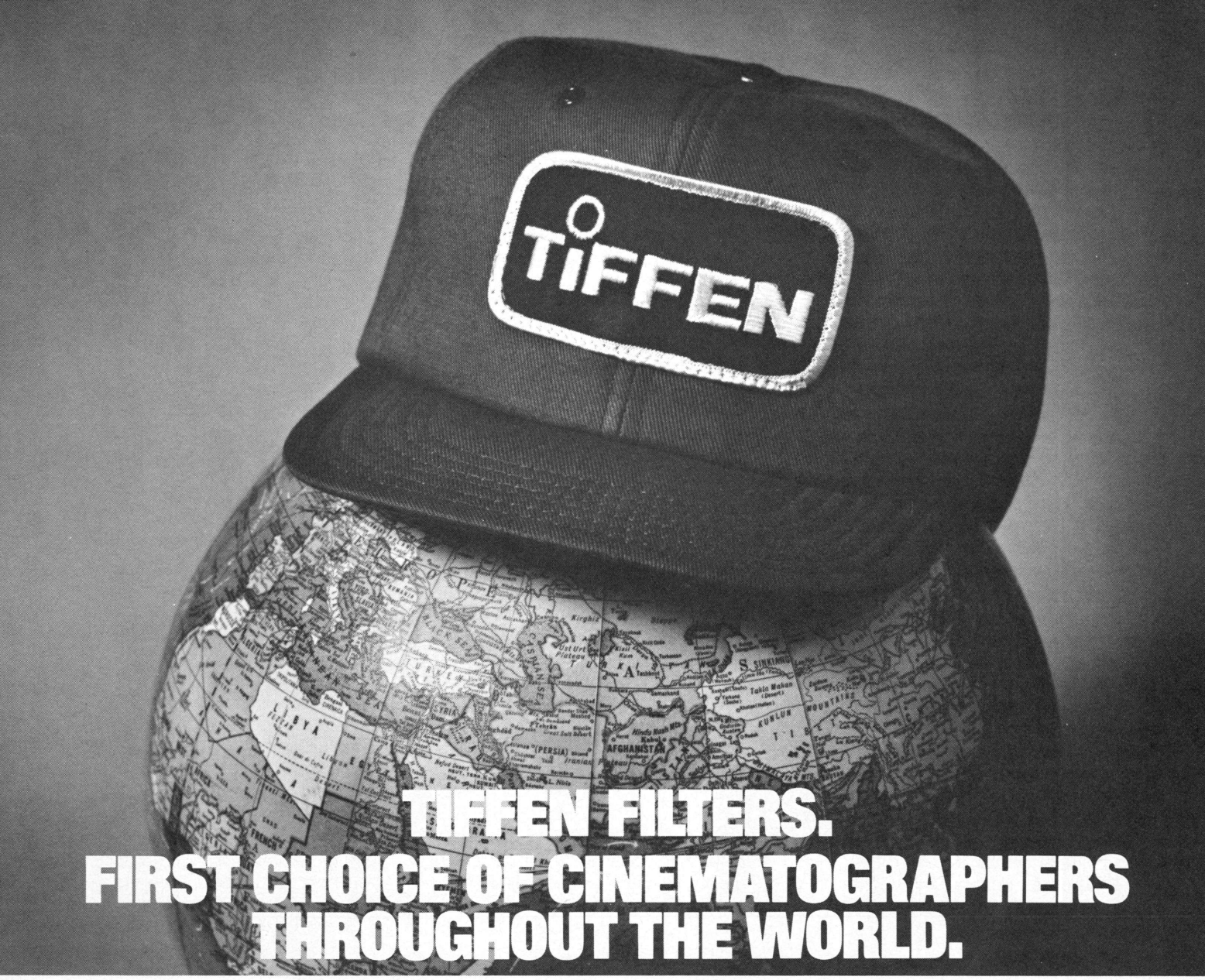

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BEHIND THE CAMERA ON STAR TREK THE MOTION PICTURE™

By RICHARD H. KLINE, ASC
Director of Photography

Photographic challenges on a cosmic scale, including the lighting of an alien entity located somewhere east of the sun and west of the moon

In a sense, STAR TREK—THE MOTION PICTURE was a victim of not enough time in preparation. Unfortunately, in the production of all science-fiction films, there never seems to be enough time—so we were not unique in that respect. Up until the filming of the very last sequence, planning had to be done on a day-to-day basis.

One of the major problems was the fact that Doug Trumbull and his special effects team did not enter the scene until deep into the filming of the principal action. Unfortunately he was not around during the pre-planning stages—which would have made it much easier for us to forge ahead. As it was, Robert Wise, Harold Michelson (the Production Designer) and I, along with a production sketch artist and several other talented concept individuals had to constantly put our heads together and try to plan ahead. There was hardly a day that we didn't meet during lunch to discuss what we were going to be doing after lunch. It always seemed to be "right up to air time."

That is the sort of pressure we were under in trying to get the project completed properly and on time, in trying to shoot the most sophisticated of all science-fiction films without sufficient pre-planning. Our main problems stemmed from not having Doug Trumbull and Company aboard earlier, plus the fact that the story was being written as we went along—which made it most difficult to plan ahead.

I would say that roughly three-fifths of the action of the film takes place on the Bridge of the *Enterprise,* where a lot of effects occur (the majority of them being *post-production* effects). We endeavored to at least make it easy for the effects people by making sure that what we were shooting on the Bridge would relate in both texture and color values to the post-production effects that hadn't been created yet. That's where Bob Wise, Harold Michelson, the sketch artist and myself had our heads together all the time.

Diverging from technical details a bit, I must say that the members of the cast were delightful to work with. Almost all of them were veterans of the original TV series, which had not been produced for a decade, but it was as if they had been put into cryogenic deep freeze and brought back to life for this feature. They looked marvelous, their attitudes were brilliant and they were very well-coordinated in their playing.

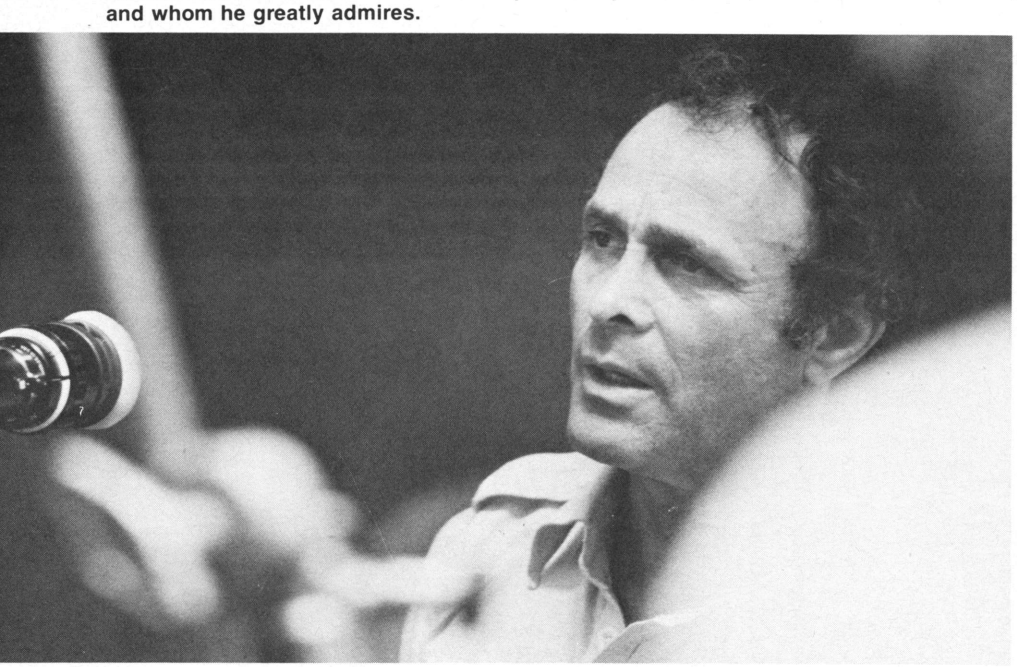
One of the two new major cast members was Persis Khambatta, a very striking woman who had to shave her head completely to play the role. That might sound easy enough, but I must say that it was rather difficult to retain a visual continuity because, just like a man with his beard, she would develop a "five o'clock shadow" on her head. Also, as a result of the constant shaving of her head day after day, she would develop a rash and a very clever type of makeup had to be applied constantly in order to hide it.

I must say that she was extremely cooperative, especially in view of the fact that there was another annoying element that she had to live with. It was a prop—a small red light that she had to wear around her throat. In terms of story point, it was supposed to be a sensor light, a direct feed to whatever was controlling her. At any rate, it was about the size of a nickel and twice as thick and we would have to stick it onto her throat in the cavity above the chest and then run two wires around to her back, where there was a battery. I must say that the poor girl was taped and untaped more times than a Rams linebacker is before and after games during his entire career. But again, she was extremely cooperative, and would stand for hours while we applied these various devices to her. From the photographic standpoint, concealment of the wires was a constant problem and the battery on her back was very difficult to light around.

Meanwhile, back on the Bridge, it was very difficult to get camera movement into the photography, mainly because the set was on several tiers. This meant that every time someone wanted to move the camera the dolly track had to be elevated and shored up, or there would be some sort of obstacle in the way of what otherwise would have been an easily accessible dolly movement or camera posi-

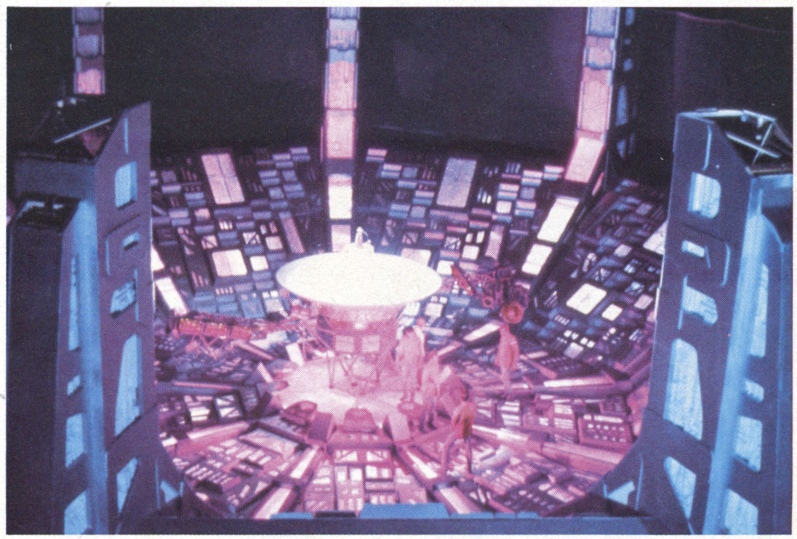
Continued on Page 180

As Director of Photography on STAR TREK—THE MOTION PICTURE, Richard H. Kline, ASC, brought to the assignment the expertise gleaned as a result of having photographed every kind of subject from CAMELOT to KING KONG. He welcomed the reunion with director Robert Wise, with whom he had previously worked on THE ANDROMEDA STRAIN, and whom he greatly admires.

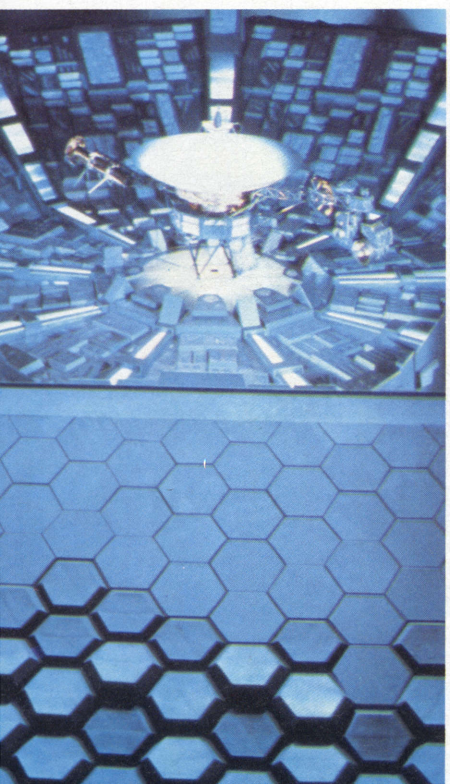


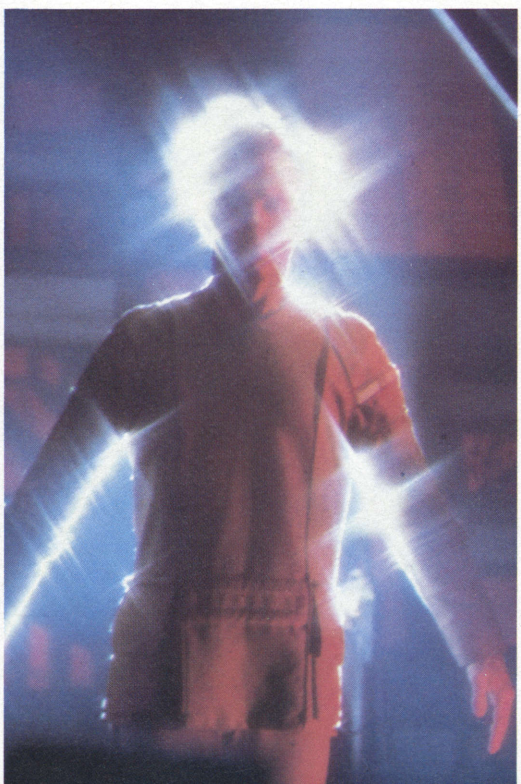
(LEFT) The camera is set up for a high-angle shot of the "V'ger" set. (RIGHT) Mr. Spock pursues his duties aboard the *U.S.S. Enterprise* in front of a bank of video monitors presenting a variety of colorful images. These images were rear-projected, which meant that in order for them to "read" strongly, the general set lighting had to be held at a very low level (approximately 20 footcandles). Much-needed depth of field, thus sacrificed, was regained through skilled use of split-diopters.

The vast "V'ger" set, a bowl-shaped construction ringed by enormous pylons, filled the largest sound stage at Paramount Studios. The size of several football fields, it required practically every HMI lighting unit in Hollywood for its illumination. Here is where visual "pyrotechnics" occur—many changes of colored light, brilliant flashes, plus a flowing kaleidoscope of "kinetic lighting" projected through the translucent flooring by Sam Nicholson and Brian Longbotham. The effect is that of a stunning, cosmic light show.



(LEFT) After penetrating the alien entity in the *Enterprise,* the crew members (never mind how they are able to breathe without spacesuits) cross a vast esplanade of hexagonal stones leading to the V'ger site. (CENTER) and (RIGHT) At the end of the film, love triumphs, as Stephen Collins and a robotized Persis Khambatta decide to make beautiful cosmic music together. They soar off into the nowhere in a blaze of shimmering light superimposed on Dick Kline's original back-lit photography by special effects expert Bob Swarthe, using a combination of slot and *moiré* techniques.





STAR TREK
THE MOTION PICTURE™

THE UNIVERSE AND BEYOND

By PETER BANKERS

Paramount Pictures' STAR TREK—THE MOTION PICTURE is what the magic of imagination is all about.

The power to soar beyond Earth, to be unshackled among celestial forces, to float freely in that dimension of space where time exists without boundaries or borders.

It is a reality that exists a million light years away from now. Yet as close as the wind to one's touch.

If art imitates life, science fiction has attempted to imitate the beyond. Science fiction is a boundless terrain, stretching the limits of possibility (and impossibility) to its nth degree.

For the hundreds of artisans involved—actors, technicians, production coordinators—STAR TREK—THE MOTION PICTURE has meant three years of dedicated work to bring to cinematic life that which has never before been seen on the screen. The goal: to dazzle the senses, to make visions soar. To make possible that journey to the second star to the right, straight on until morning.

This Gene Roddenberry Production of a Robert Wise Film reunites the entire *"Star Trek"* cast, headed by William Shatner as Captain Kirk, Leonard Nimoy as Mr. Spock and DeForest Kelley as Dr. Leonard "Bones" McCoy. Also on board are James Doohan as Chief Engineer Montgomery "Scotty" Scott, George Takei as Sulu, Majel Barrett as Dr. Christine Chapel, Walter Koenig as Navigator Pavel Chekov, Nichelle Nichols as Communications Officer Uhura and Grace Lee Whitney as Transporter Chief Janice Rand. Newcomers to the cast include Stephen Collins as Executive Officer Willard Decker and Persis Khambatta as the exotically beautiful and sensuous Ilia, from the Planet Delta Four. The filming required the use of eight huge soundstages at Paramount Studios.

It is the 23rd century, and STAR TREK—THE MOTION PICTURE hurls us into the universe and beyond.

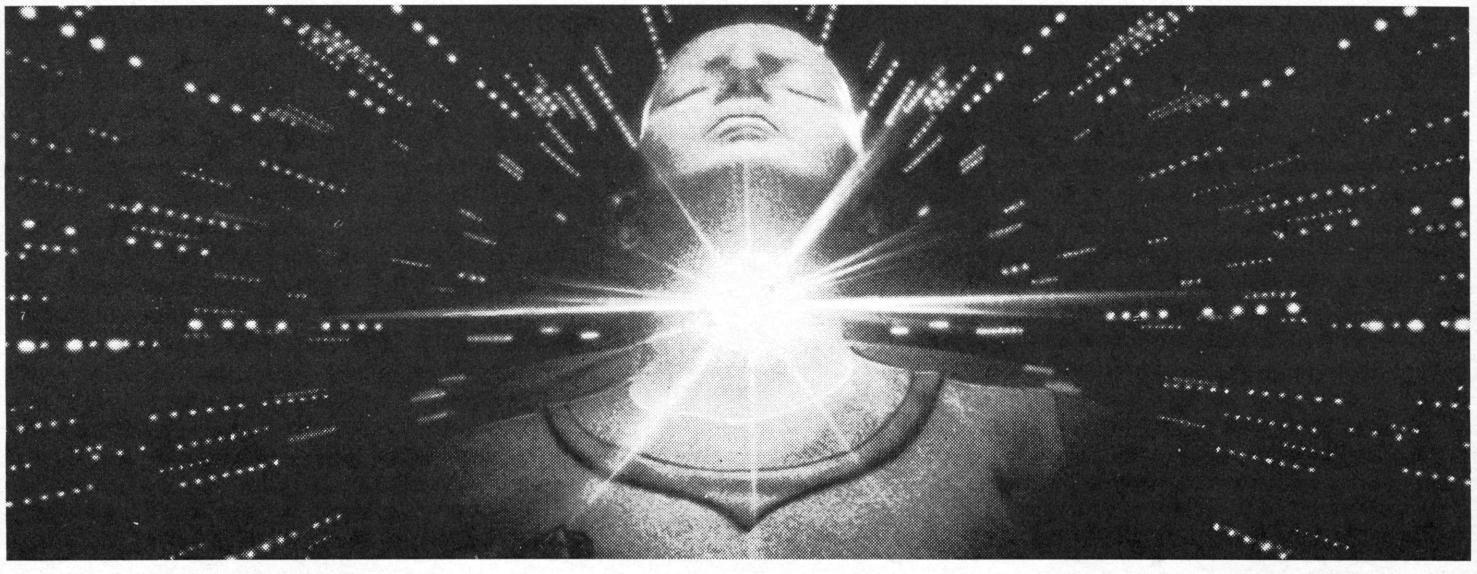
This is the credo of the Starship *U.S.S. Enterprise,* the most sophisticated spaceship on Earth, equipped with the most powerful weapons system in the fleet: "Space, the final frontier. The Starship *Enterprise*'s mission (is) . . . to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before."

Now the *Enterprise* is challenged by a destructive force of intense magnitude. The stage has been set for the great adventure.

Whether or not one is a fan of the original series (and "Trekkies" have become part of international folklore), STAR TREK—THE MOTION PICTURE is the culmination of an audience phenomenon unsurpassed in our time. For millions of devoted followers, the launching once again of the *U.S.S. Enterprise* is an historic occasion. For those unfamiliar with the series, it will serve as an introduction to a gallery of colorful characters etched by the original cast members re-creating their famed roles.

The demands of the large screen have meant a complete refurbishing of the *Enterprise.* Four huge soundstages on the Paramount lot were taken over by the *Enterprise,* with technicians building advanced technological computerized equipment. Each station on the new Bridge of the *Enterprise* was completely operable. Each cast member was required to learn how to use the complex instruments on the panels and to know the coding of the various flashing lights, signals and screens. Many months were devoted to the intricate designing and building of the sets, with every minute detail precisely structured.

The highly advanced technological apparatus—including such gadgetry as phaser guns, photon torpedoes, communicators and tricorders—and the flying ships were the result of extensive research. Among the groups furnishing advice on the film was the National Aeronautics and Space Administration (NASA), including its Jet Propulsion Laboratory. The object of the research



was to extend science fiction into the science fact of tomorrow.

With the imposing demands of the giant screen, audiences will view the complex world that is self-contained in the *U.S.S. Enterprise,* with its 431-person crew. The Starship's interiors were built life-size, and audiences will be able to examine on screen the intricate sections of the giant craft, including the bridge, the engineering deck, the medical quarters, the transporter room.

The *Enterprise* is a veritable floating city, a dazzling space machine bursting through the galaxy at a speed 218 times that of light. It is 947 feet long and 417 feet wide—more than three times the size of a football field.

Dozens of recognized experts in the field of science and space assisted in advisory capacities during the production of STAR TREK—THE MOTION PICTURE. While such details might be missed by the average layman, the creative team behind the film sought to ensure authenticity in every phase of production. This extended not only to the Enterprise sets, but to the Klingon cruisers, a Vulcan shuttle and numerous space travel crafts as well as a remarkable space office complex and orbital dry dock.

The creative leadership demanded by a project of the magnitude of STAR TREK—THE MOTION PICTURE centers around two veteran talents with outstanding past achievements.

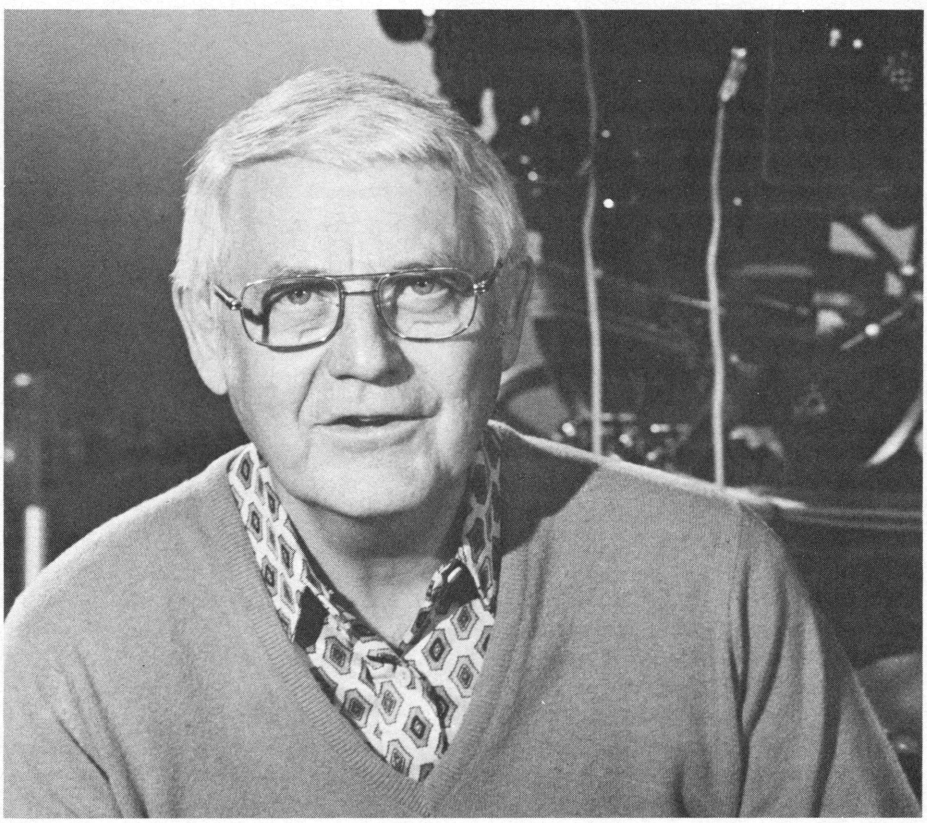
Producer Gene Roddenberry, a distinguished motion picture and television producer and writer, was the creator and producer of the original "Star Trek." Director Robert Wise is the winner of four Academy Awards (two each for THE SOUND OF MUSIC and WEST SIDE STORY) and a recipient of the prestigious honorary Irving G. Thalberg Award. Recognized as one of the screen's foremost director-producers, he was cclaimed for the science fiction classic, THE DAY THE EARTH STOOD STILL. Wise's other outstanding hits have included THE ANDROMEDA STRAIN, THE HINDENBURG, THE SAND PEBBLES, I WANT TO LIVE, RUN SILENT, RUN DEEP, THE HAUNTING, THE BODY SNATCHERS, SOMEBODY UP THERE LIKES ME, THE SET UP and EXECUTIVE SUITE. One of his first film assignments was as the editor with Orson Welles on the famous CITIZEN KANE. The skill and imagination Wise demonstrated led him to Welles' THE MAGNIFICENT AMBERSONS, and the direction of added scenes in Welles' absence before the opening of the film.

STAR TREK—THE MOTION PICTURE marks the 38th motion picture in

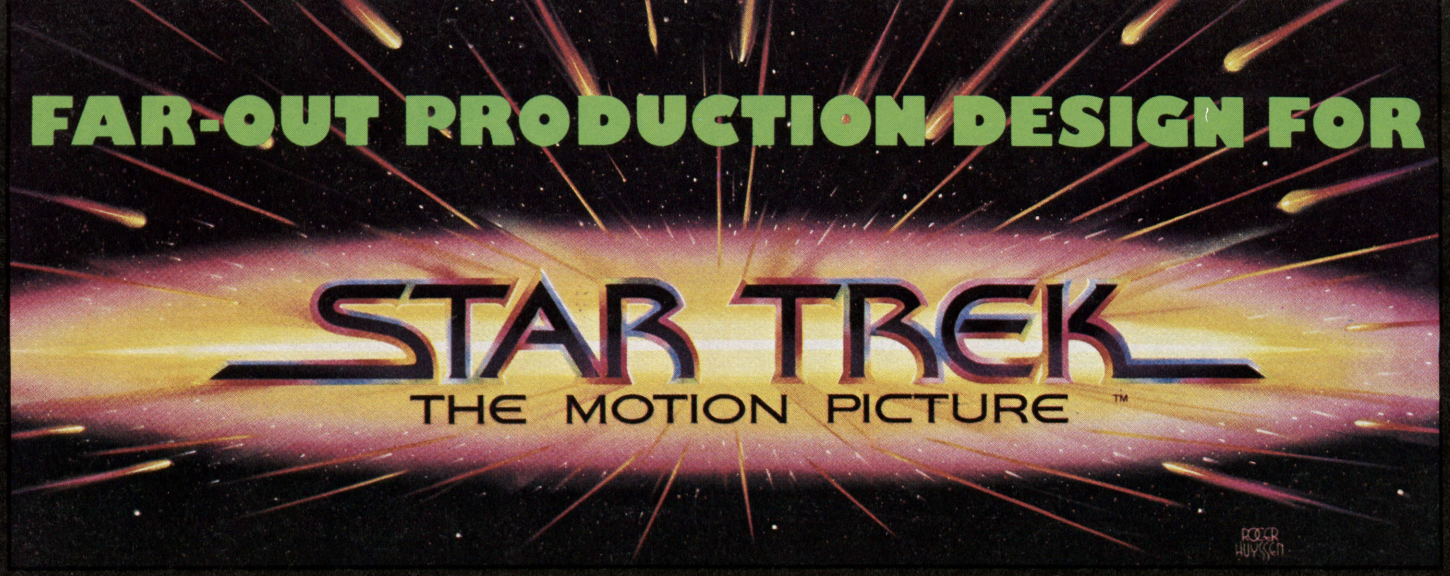
Continued on Page 176

Gathered together here is the cast of Paramount Picture's STAR TREK—THE MOTION PICTURE, the spectacular screen adventure in which the *U.S.S. Enterprise* encounters a powerful alien force. Left to right are stars George Takei, James Doohan, Grace Lee Whitney, Nichelle Nichols, Stephen Collins, DeForest Kelley, Majel Barrett, William Shatner, Leonard Nimoy, Persis Khambatta and Walter Koenig. All of the principle cast members of the original *"Star Trek"* TV series (which ceased production a decade ago) were reunited for the feature version.

Robert Wise, director of STAR TREK—THE MOTION PICTURE, and winner of four Academy "Oscars" (two each for WEST SIDE STORY and THE SOUND OF MUSIC). Beginning his career as a "gofer" at RKO Studios in the 1930's, Wise worked his way up through the editorial ranks and five years later made his first mark in the industry as Editor of Orson Welles' classic CITIZEN KANE. His long apprenticeship in the technical phases of production enabled him to become the consummate filmmaker that he has remained ever since. Few directors in the industry have been as highly respected and beloved by crews as Wise.



FAR-OUT PRODUCTION DESIGN FOR



Speculating how things will look 300 years from now, redesigning the *Enterprise*, creating a really different alien entity—all accomplished

By SCOTT HENDERSON

"We had what we thought were some really outlandish ideas of the way things would be 300 years from now. Then I sent out these ideas to the Jet Propulsion Laboratory and our ideas seemed old-fashioned. They have amazing things, like a computer that can draw and paint and do anything. It really shook me up."

Thus does Harold Michelson, veteran production designer for STAR TREK—THE MOTION PICTURE, describe the challenge of Paramount's new multi-million-dollar space adventure.

The setting is the 23rd century for the Gene Roddenberry Production—a Robert Wise Film. With the Earth threatened by an incredibly powerful alien force, the Starship *Enterprise* is forced back into service.

Michelson's task, shared with art director Leon Harris and a staff of 17 expert draftsmen, illustrators and graphics designers, included the designing of an expanded, updated and more sophisticated *Enterprise*. Sets for the space craft, some depicting parts of it never shown before, combined with other imaginative sets to fill 10 huge sound stages at the Paramount Studios in Hollywood.

Among these were a San Francisco tram station of the 23rd century and an orbital drydock above the California city, a Federation monitor station far out in space, a remarkable space office complex, the interior of a Klingon cruiser, and the mysterious enemy.

"The problem was to show an era so far in the future, and yet stay ahead of today's technology," Michelson says. "We could let our imaginations run wild. But, the producer (Gene Roddenberry) and the director (Robert Wise) insisted whatever we designed and built must be completely believable to audiences. They also insisted we use materials, furnishings, whatever, that didn't look like anything known today.

"It was a helluva challenge."

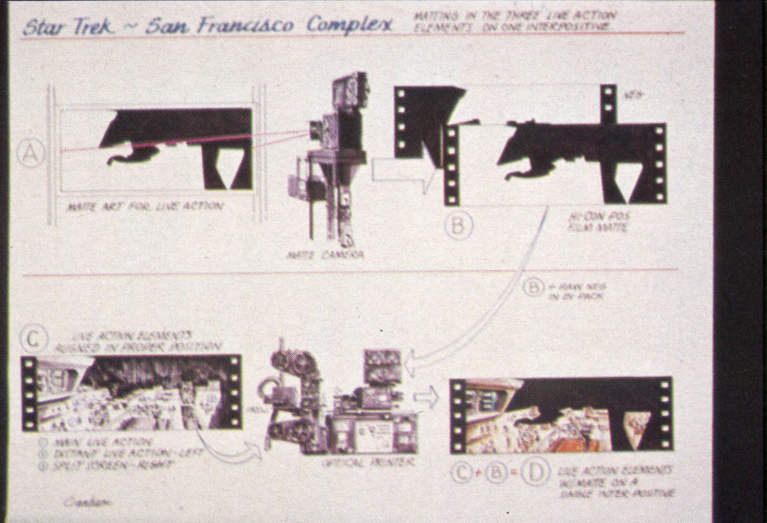
What it meant was that everything for the film STAR TREK—THE MOTION PICTURE, from set construction to furniture to props and various gadgets and instruments, had to be designed and made from scratch. There was no store or warehouse where Michelson and his crew could buy finished products. Nor were there any old sets stored away at Paramount that could be utilized.

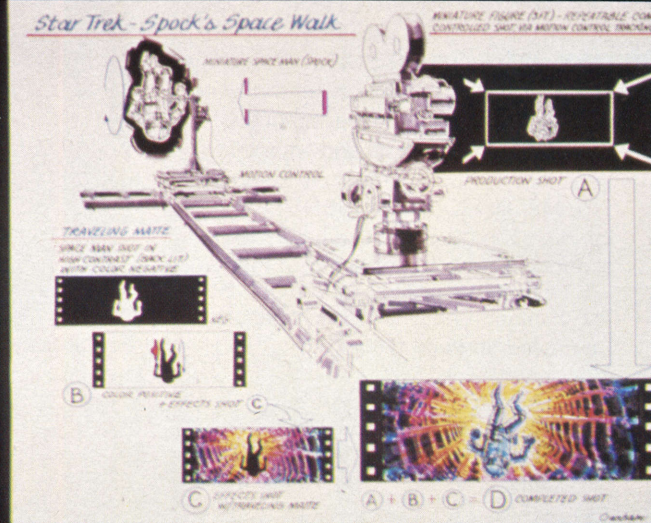
The primary challenge was one of basic architecture, says Michelson. "How does one anticipate how the architecture of 300 years from now will look? It will probably be so far-out that it will make anything we can imagine now look old-fashioned. That being the case, I realized that I could not rely solely on architecture to get a futuristic effect. Let's face it—you have to go from someplace, so you go from what we now consider to be modern architecture. But I felt that the extra dimension would have to be added by means of lighting—which would call for very close cooperation with the cinematographer and the lighting technicians. I tried to design architecturally to allow for, let's say, 50% of the illusion to be light and light effects. I think that approach worked out very well.

"Specifically, on the *Enterprise* itself, I considered the idea of having everything lit from below—just to give it a different look. I realized that this would require a close working-together with the Director of Photography. When I told Dick Kline what I had in mind, he liked it and went along with the idea. He was cooperative to an incredible degree."

Michelson was also aided in his concept of light-plus-architectural design through the efforts of Sam Nicholson and Brian Longbotham, two young electrical wizards who had been assigned by director Robert Wise to add "a feeling of

Hundreds of design sketches and storyboard panels were prepared for the STAR TREK feature. (LEFT) Sketches indicating details for matting the opening San Francisco Complex sequence. (RIGHT) Diagrams and sketches analyzing the elements involved in creating the illusion of Mr. Spock's space walk.


Star Trek ~ San Francisco Complex
MATTING IN THE THREE LIVE ACTION ELEMENTS ON ONE INTERPOSITIVE
A
MATTE ART FOR LIVE ACTION
MATTE CAMERA
B
HI-CON POS FILM MATTE
(B) + RAW NEG IN EN-PROX
C
LIVE ACTION ELEMENTS ASSEMBLED IN PROPER SEQUENCE
1 MAIN LIVE ACTION
2 DISTANCE LIVE ACTION - LEFT
3 SPLIT SCREEN - RIGHT
OPTICAL PRINTER
(C) + (B) = (D) LIVE ACTION ELEMENTS INTIMATE ON A SINGLE INTERPOSITIVE


Star Trek - Spock's Space Walk
MINIATURE SPACE MAN (SPOCK)
MOTION CONTROL
PRODUCTION SHOT
A
TRAVELING MATTE
SPACE MAN SHOT IN NON CONTACT (BACK LIT) MATTE COLOR NEGATIVE
B
COLOR POSITIVE + EFFECTS SHOT
C
EFFECTS SHOT WITH TRAVELING MATTE
(A) + (B) + (C) = (D) COMPLETED SHOT

The huge V'ger set was a triumph of architectural design, although its translucent plastic flooring was perhaps not as strong as it might have been, creating a certain anxiety for cast and crew members moving about in it. Under the set was an incredible array of units for creating the unique lighting effects.

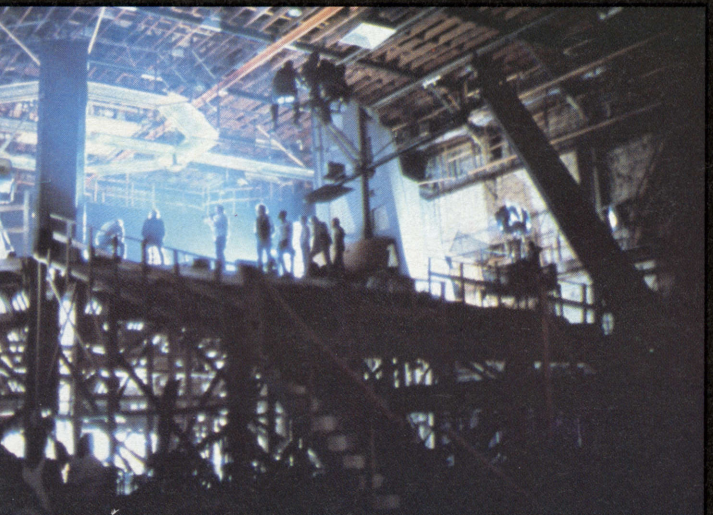
power'' to the engine room sequence.

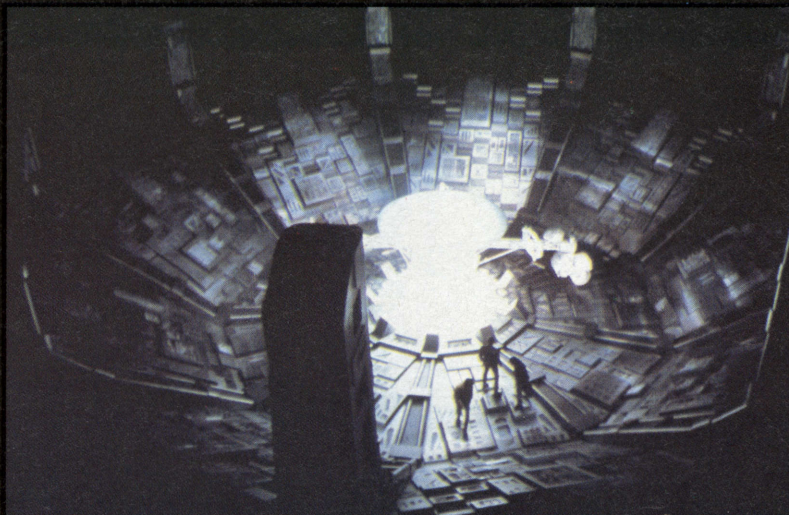
''We had an engine that was lucite with a lot of aluminum and chrome,'' explains Michelson. ''Bob Wise wanted it to radiate an impression of power, but not by means of the red and yellow tones usually associated with power. Instead, Nicholson and Longbotham, using strips of paper, aluminum foil and *blue* light, created a feeling of tremendous power.

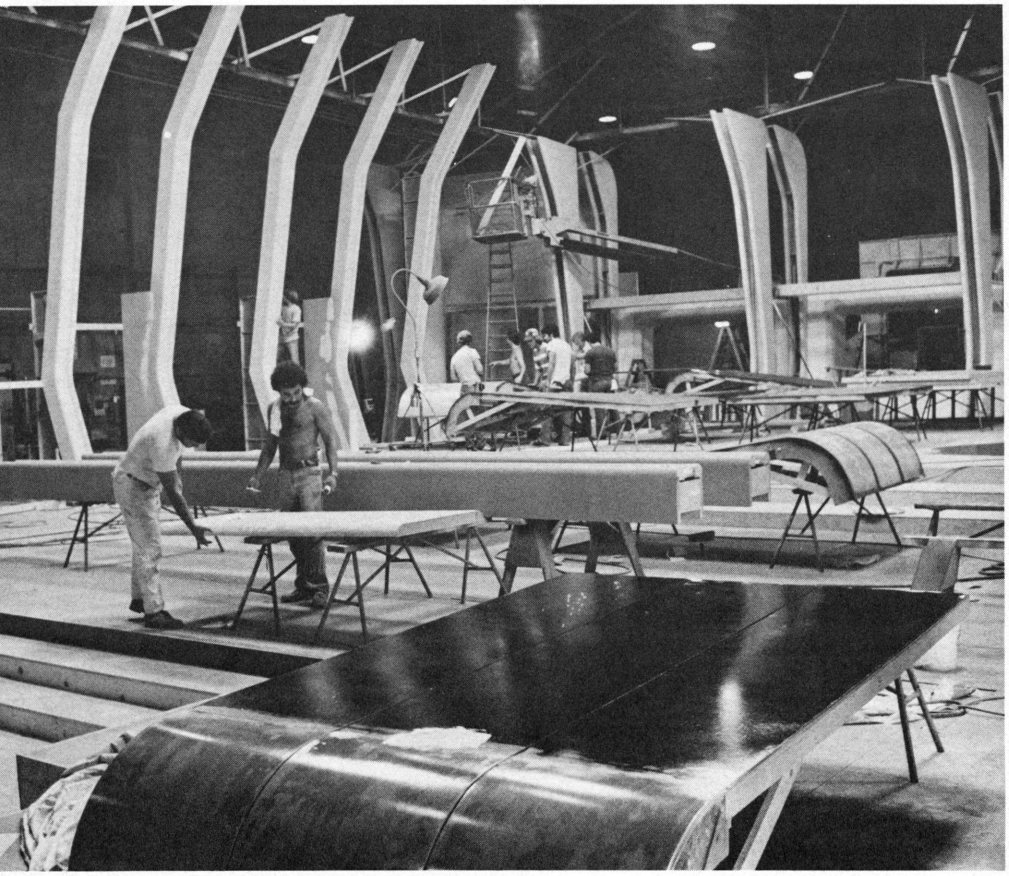
''In the final ('V'ger') sequence they rigged a complex of equipment under the set that created the illusion of light flowing like water. It came in waves and had a pulsing effect that implied that the set was something that was alive. You can't do that with architecture. You can't do it with smell or taste. You have to do it visually, which is what they did by having light flow from the center out to the edges of the set.''

One of the major problems in designing this particular feature was the fact that there were certain built-in limitations

The sheer complexity of the "V'ger" set construction illustrates why production designers have to be architects, as well as artists. Although most of the action of the STAR TREK feature takes place on the Bridge of the *Enterprise*, V'ger is the most spectacular set by far and involved the most original design.







Elements of the V'ger set under construction at Paramount Studios. According to producer Gene Roddenberry, the aim in producing the feature version was "to keep it recognizably STAR TREK, but of far greater dimension." This meant more spectacular sets than were ever seen in the TV version.

to how far the imagination of the production designer could go, due to the fact that the incredibly devoted "Trekkies" would not stand for too much deviation from the familiar elements of the "Star Trek" TV series which they have followed fanatically for so many years.

"Still, I had to do whatever I could to make it look like something more impressive than just a TV show," observes Michelson. "The version that appeared on television utilized small sets and much of the action was played against blank walls. This was due to time and budget restrictions, but it was acceptable on the small canvas of the television tube. However, we were making a 'big' picture for wide-screen presentation, so I had to try to open it up and create an illusion of a tremendous amount of space on the Enterprise. Here, after all, was a starship that could go out into the Cosmos and cruise around for five years non-stop, totally self-sufficient. This is the reason that Bob Wise asked for the huge recreation area in which 400 or 500 people appear. It was there to show the audience that this ship was really loaded with people."

A combination of matte paintings and backings extended the already huge sets, giving them an "infinity" look and creating a feeling of tremendous production value. As for how the interior of a giant starship would look 300 years in the future, Michelson says, "Quite frankly, I don't know. You make drawings; you push the charcoal around, until finally something evolves that looks good—and, in dealing with the future, you can always rationalize it to be what you want it to be. I would arrive at a design and show it to Bob Wise. If he liked it, we would go ahead with it—always allowing for what light would do to the set, because light was our extra dimension."

After designs for sets had been approved, Wise, as is his custom, would have the sequences heavily storyboarded by a series of artists.

The matter of surfaces and materials for the various futuristic sets came under heavy consideration. "We had a marvelous painter on this picture," says Michelson, "and we spoke to him about the interior of the ship and the materials that might be used in the future. I told him, 'Now, it's not plastic and it's not metal and it's not this, that or the other thing—but it should look fantastic. What can you do?' Well, he gave the structural elements five or six coats of a metallic paint until the final result looked like the finish on a car you would love to have. It was marvelous. It had a very high gloss, but it also had a depth, so that you didn't know what it was. For the floors we used circles of black rubber that also looked like something different.

"For the interior structure of the *Enterprise* we tried not to have square corners. We curved and softened everything to give it a sculptured look, and to make it appear to be floating. Even in the control room we had an entire balcony that was cantilevered out, with light below it. The beds in the hospital were held up by one heavy member, so that they appeared to be floating also. We hoped the audience might get the impression that these people of the future had conquered gravity, or something like that. We did just about everything to keep it from having a conventional look.

"And yet, we always had to keep in mind the functional aspects of the sets. The *Enterprise* is, after all, a space

Mr. Spock, with long hair and in medieval drag, is reintroduced receiving an accolade of his peers on his native planet, Vulcan, in a kind of "Valley of the Kings" setting. The huge foot next to them belongs to one of the gigantic statues in the location, most of which was a matte painting by Matthew Yuricich.

battleship. As on a seagoing battleship, we had to utilize every bit of space—and still make it look good. Some of the crew quarters were in the form of tubes. I had an art director working with me, Leon Harris, and he dug into this aspect of the design and did some marvelous things with it."

The most familiar set to *"Star Trek"* fans is the circular Bridge of the *Enterprise,* with science, communications, security and other stations spaced around its perimeter. From his seat near the center, Captain Kirk (Shatner) gives his commands.

"We knew this set had to be recognizable, otherwise those fans wouldn't accept it," Michelson declares. "Yet, we also knew we had to give it the look of a big motion picture, the quality and detail it couldn't have within the limitations of television.

"When we came on the job, a Bridge had been built for what at one time was planned as another TV series. When the decision was made in favor of a big-budget, theatrical movie, everything had to be done over.

"The Bridge had been built in a number of sections, which could be moved in or out according to the scene being filmed. Richard Kline, cameraman on STAR TREK—THE MOTION PICTURE, likes to film within a set, so the sections were virtually welded together. Thus, also the seams wouldn't show and it would look solid. In fact, it was. It's still being kept that way, intact for possible sequels.

"Then, we put in a ceiling, which it hadn't had. We adapted this from the end of a jet engine, with instruments in it and lighting that allowed the people to be lit individually.

"One of the difficulties in a circular set is that everything, from whatever angle, looks the same. So audiences could orient themselves as to where we are on the Bridge, we moved a couple of stations around to face in a different direction.

"For example, if the camera is shooting toward the viewer screen, audiences should know that Chekov (Walter Koenig) is at a station on the left, as is Uhura, the Communications Officer (Nichelle Nichols).

"The instruments and graphics at each of the stations, and throughout the *Enterprise,* were meticulously designed. We were warned against having anything with a pinball machine effect. Everything had to work—in fact, the actors had to learn from charts the operation of each station. Alex Weldon and his special effects people did a remarkable job with this.

"Actually, the outside of the Bridge, the part that never will be seen by audiences, was almost as interesting as the interior. It was covered with hundreds of miles of wire, for all those instruments and panels." (Weldon put the figure at more than 400 miles of wiring.)

Designing the chairs on the Bridge, particularly that of Captain Kirk, was another creative, imaginative achievement. They were shaped to the human spinal column.

"They have radiating nerve endings, assuming that there is something magical in the chairs that would massage or relieve any pain," Michelson explains. "After all, 300 years from now, you can have a remarkable chair.

"During combat, the arms fold in a clasp around the person like an automobile seat belt. The back rest would pop up and completely encircle and secure the person. We installed motors to make the arms clamp down."

Michelson has this to say about some of the other sets that will be familiar to fans of the *"Star Trek"* TV series in STAR TREK—THE MOTION PICTURE:

"We believe they'll all be recognizable, yet fans will also be aware of the changes and I think will approve of them.

"The transporter room, we decided, should give viewers the feeling they are inside a fantastic machine. After all, the idea of transporting people by breaking them into molecules and sending them off someplace is fantastic. We got rid of some of the earlier gaudy colors. Between the transporter, which is virtually unchanged, and the console where the Transporter Chief Rand (Grace Lee Whitney) is stationed behind glass, we covered the entire floor with vacuum-molded pipes and wires, and covered that with a see-through grating.

"The engine room is greatly expanded. Mr. Wise wanted a feeling of tremendous power, but not with the coloring of fire as we would get today. So we went to different shades of blue going to white. The vertical core, now two and a half stories high, and the horizontal part of the engine, appearing to go off into infinity, were all newly designed and made of plexiglass. To make room for the horizontal section, we broke through the end of the set and, using forced perspective, gave the exaggerated impression of its length.

"In the filming, small people, midgets, were used as crew members at the far end, continuing the perspective. What we did was break out from a small set into a lot of size.

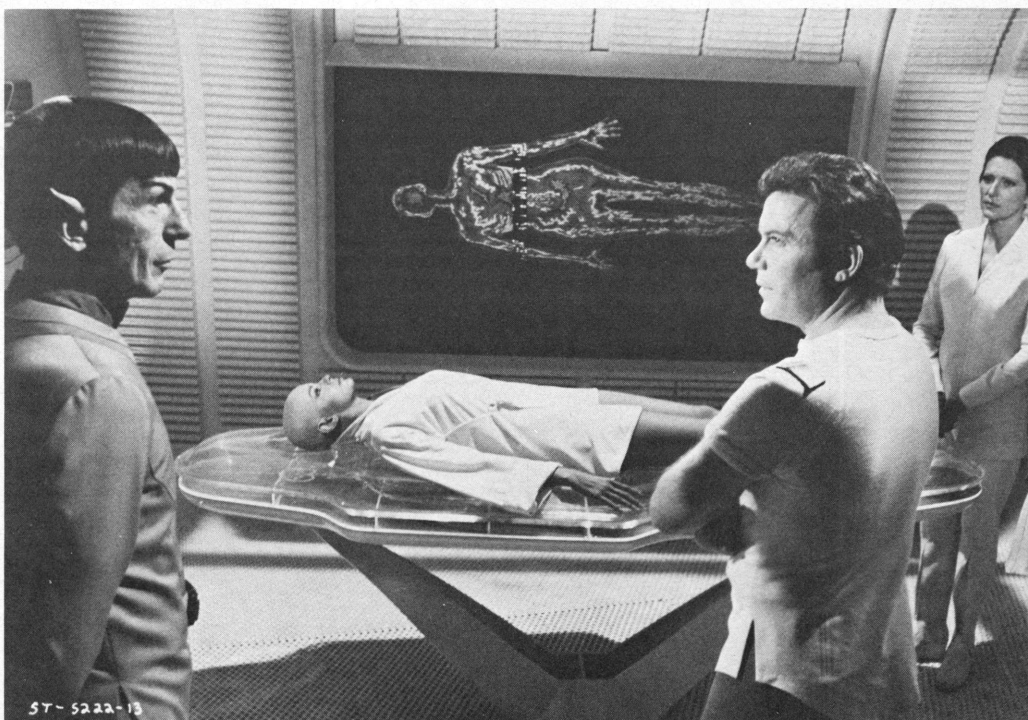
"Doc McCoy's (DeForest Kelley) Sickbay was designed, as were many of the other sets, to follow the configuration of the space ship. We introduced a number of new instruments, some of which were chrome-covered from war surplus cases that once held shells, some from unusually designed planters.

"The medical quarters start with McCoy's office and laboratory, continue with the examining room featuring a transparent table with a skeleton of the human body and all its nerves drawn on it. It gives an eerie feeling, particularly when the Deltan Ilia (Persis Khambatta) is examined on it and a laser bean traces her body on a screen above the bed.

"The Sickbay, very hospital-white, has its specially-designed beds built on one post to appear floating. The beds were made of fiber glass, and wired for lighting. Monitors behind each measure the temperature, blood pressure, etc., of the patient."

Continued on Page 189

Aboard the Enterprise, Mr. Spock (now with chic short hairdo that effectively sets off his pointed ears) and Captain Kirk, observe a scan of the torso of Ilia (who proves that "bald is beautiful"). The cantilevered examination table is typical of forms on the starship designed by Harold Michelson so that they appear to be floating.



Richard H. Kline, ASC

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"We used almost every kind of light source available in modern filmmaking, including incandescent, HMI, strobes and Xenon.

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Scene from Paramount Pictures production of "STAR TREK—The Motion Picture"
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THE VERY SPECIAL EFFECTS FOR STAR TREK THE MOTION PICTURE™

An interview by
HERB A. LIGHTMAN

Three hundred technicians working 12 to 18 hours a day, seven days a week, are what it took to make these effects so special

Literally hundreds of people were involved in the creation of the complex special effects for STAR TREK—THE MOTION PICTURE (a fairly comprehensive list of credits appears on Page 176), but it would be virtually impossible to specify exactly who did what on the intricate project. The truth is that the efforts of the myriad technicians overlapped to the point where individual identity was subordinated to the demands of the project—a quintessential example of teamwork on a massive scale.

The three major personalities leading the various contingents of technicians who worked simultaneously on the effects were: Douglas Trumbull (Director of Special Photographic Effects), John Dykstra (Supervisor of Special Photographic Effects) and Richard Yuricich (Producer of Special Photographic Effects). Working separately, but in close concert, they created a result representing an incredible meld of talents.

Dykstra had previously worked with Doug Trumbull on THE ANDROMEDA STRAIN and Trumbull's own production, SILENT RUNNING, before going on to win an Academy Oscar for STAR WARS and an Emmy for BATTLESTAR GALACTICA.

In the following interview, Dykstra discusses the contributions of his group (Apogee, Inc.) in creating some of the special effects for STAR TREK—THE MOTION PICTURE:

QUESTION: Now that your work on the picture is done, and things are beginning to come back into perspective, how do you view the experience?

DYKSTRA: At this point I would say that the effects for STAR TREK–THE MOTION PICTURE are probably the most effects I've ever done or worked on in such a short period of time. The major thing that amazes me is that all of those effects, the editing of those effects and the music for those effects could be completed in the span of time available and still turn out to be what I would consider good. For example, we had a shooting ratio of somewhere around 1 1/2-to-1 on our opticals–which means that many of the composites were put together the first time they went through the printer. Now, that wasn't the shooting ratio of the original photography–meaning the material that was shot to be combined in the printer–but it's still amazing. Roger Dorney (who headed up the Optical Department) and the people working with him were incredible.

QUESTION: The creation of the special effects for this picture have been described by some as "the most massive effort of its kind in the history of the medium." Is that an exaggerated statement, or did it actually seem that way to you?

DYKSTRA: Let's put it this way: frankly, the whole thing was a life or death struggle for all of those people. It was a total group effort, because I wouldn't have had enough energy–even if I'd had all the money and all the people in the world–to get all of that stuff done. Nobody could direct everything that had to be ready right down to the minute without having crews who were capable of coming in and giving 110 percent of themselves to the project. They did it over a period of three months–12 to 18 hours a day, seven days a week. They truly got into it. There were casualties, of course; some people got sick. It's hard enough to generate that kind of enthusiasm for a picture even if you started on it from scratch, but to have people come in halfway through and get that hot for it is amazing. Beyond the crew, the technology itself is sort of miraculous.

QUESTION: I know that, because of the tight time squeeze, the major effects were divided up between your group and Doug Trumbull's group, but could you tell me about some of the major sequences that your people worked on?

DYKSTRA: We provided the major material for the opening Klingon sequence. We shot all of the elements and the artwork. It was the sequence in which we used motion control techniques more extensively than in some of the other areas of the picture that we worked on. It was more along the line of the kinds of things we did for some of the other shows that

John Dykstra, who headed the Academy Award-winning special effects team on STAR WARS, was called in, along with Douglas Trumbull and Richard Yuricich, to work on special effects for STAR TREK—THE MOTION PICTURE when the project was well along in production. According to Dykstra, he had approximately 100 people working on the assignment, while Trumbull had 200.

we worked on, with regard to vehicles traveling in space and the moving camera platform approach.

QUESTION: How did the short time schedule affect the decision-making process in regard to effects?

DYKSTRA: Decisions regarding technique had to be made immediately, because the stuff had to be out by the end of the week. There wasn't much time to fiddle around and say, "Let's try something like this or like that." So we took a relatively direct approach to the thing. For example, there wasn't too much hoo-haw in that opening sequence, except for the initial overhead rollaround shot that we did.

QUESTION: To what extent were you influenced by effects that had been established in the *"Star Trek"* TV series?

DYKSTRA: Well, we did some of the Transporter stuff [in which crew members were "dematerialized" in some far-off location and then "rematerialized" aboard the Enterprise] and the Transporters were basically the same kinds of devices as in the TV show. But this worked quite well actually, because if we had changed a lot of it around from what it was like in the TV version and gotten too fancy with it, we would probably have lost a lot of the loyal audience. Many of those people actually came to see the same kinds of things happening again. At any rate, we added a little laser effect to the outside of the tube and a little bit different kind of sparkle inside it, and then—to dramatize the malfunction—we used a pellicle or mylar mirror distortion to misshape the people who were supposed to be inside the tubes.

QUESTION: What other sequences was your group involved in?

DYKSTRA: Basically, the "V'ger" stuff at the end of the picture was the next big chunk of material that we worked on. That was the introduction to the vessel after the clouds part, where we see the back end of the thing off in the distance and then fly up over the back of it. That's where the motion control techniques came back into play. The model was basically built to incorporate everything that was supposed to go into it, because we didn't have time to add any kind of artwork or special matte movement in a separate piece. Most of the shots in that sequence required seven to nine passes through the camera and they were composited in-camera because we just simply were buried; we were running out of time everywhere. At any rate, we approached the back end of the thing and went up over the top and then through the valley with the power vanes. The "Power Vane Valley" is what we called it and it was basically where the cloud that you saw surrounding the vessel was supposed to be generated.

The Klingons, super space villains with knots on their skulls, are given a rough time in the opening sequence of the STAR TREK feature, as a mysterious alien force cruising through space, zaps them with powerful electrical discharges that crawl all over their ships and destroy them. The Earthlings, watching all this on their scopes, send the *Enterprise* out to intercept the challenger.

QUESTION: The whole concept of the "V'ger" entity was so far-out, literally. Do you know who was mainly responsible for visualizing such an abstract concept?

DYKSTRA: It was probably a combination of people, but Syd Meade did some illustrations on the show and he turned out to be incredible in his ability to take something that was absolutely intangible in the minds of the people who wrote, directed and produced this film and come up with something that they liked. They had some expansive concepts, but for all of their involvement with the thing in the script, nobody could put a physical shape or direction or look on it. So Syd came up with this V'ger thing, and on top of that, he came up with a reason for why it was shaped the way it was and how it worked, which was really great. His illustrations served very, very precisely as a basis for the imagery that ended up in the film?

QUESTION: Can you tell me more about the power vanes that you mentioned earlier?

DYKSTRA: The power vanes were what appeared to be big banana-shaped rivers on either side and they were supposed to be filled with electrical discharge but, as often happens with the stuff after you have completed it, somebody else times it and his interpretation may be different from what you had in mind. I don't mean to imply that I was left out of any of these decisions, because really, genuinely, the production staff on this project was great in terms of including Doug and myself in the decisions to be made about the movie. They gave us far more recognition and respect than most producers and directors give the people who are doing this kind of thing for them. It's just that I was doing one thing while somebody else was doing another and so I missed out on being able to put in my two-bits about trying to make that sequence a little bit lighter. It needed to be dark, because it was supposed to be ominous, but then again, it needed to be a little lighter so that you could see more of the detail. But that's a subjective opinion for sure.

QUESTION: How far did you people go with that sequence?

DYKSTRA: Well, we go through the power vanes where the electrical discharge stuff is and we go on up to what we called "V'ger Valley" (which sounds like the name of a new ski resort) and then out the front of the vessel. Then the Energy Probe comes on board the Enterprise. The Energy Probe is that bright pole that wanders around and goes through the computer. That sequence

Continued on Page 174

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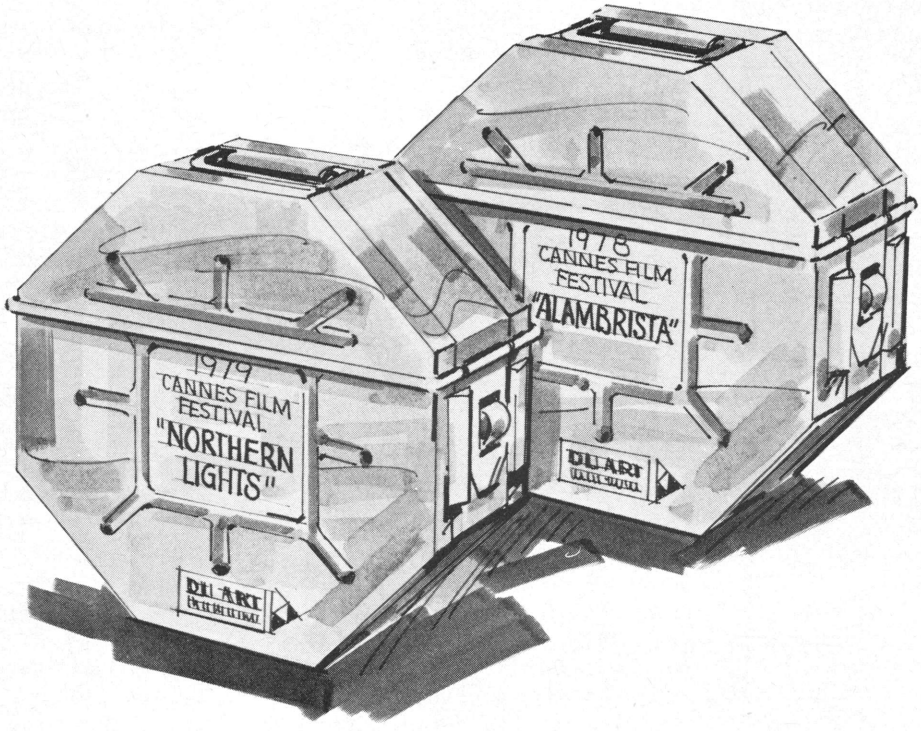

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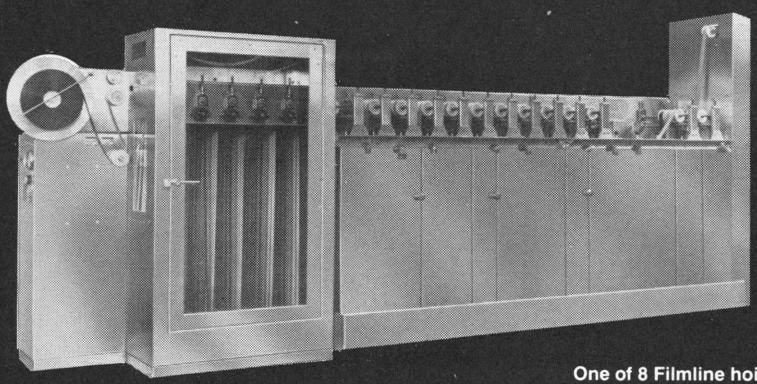

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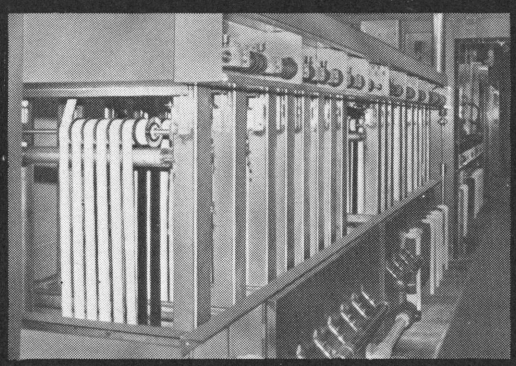

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KINETIC LIGHTING FOR STAR TREK THE MOTION PICTURE™

With "light guns" drawn and ready, this team of young wizards creates waves of flowing, pulsing light to enhance the excitement of the action

By SAM NICHOLSON

You're standing beside a towering matter anti-matter reactor. It's running white hot. The *USS Enterprise* is locked in deadly combat with a hostile alien energy. Scotty's voice cuts through the chaos, "Systems are overloading, Captain." Unfortunately he's too close to the truth. Inside the reactor a three-story-high kinetic lighting system is gradually overheating, threatening to melt its heat-sensitive walls. Yet the *Enterprise* avoids disaster, returning her matter anti-matter balance to normal and the reactor slowly cools.

A couple of months prior to this scene the *Enterprise* had no engine. Actually, her huge reactor existed; missing was the reaction itself. So what does a matter anti-matter reaction look like? And once you've figured that one out, can you replicate, install and operate one aboard the *Enterprise*?

These questions as presented by Robert Wise to Brian Longbotham and myself seemed challenging to say the least. Previously we had developed a series of live-action visual effects on film and video tape, although nothing the size or nature of this project. Yet accepting the challenge, we began development of a "kinetic lighting system" capable of producing speeds in excess of warp seven!

After many prototypes we arrived at a solution consisting of 35 individual "light guns". Each gun was a self-contained kinetic light projector with fully remote speed, intensity and color change capabilities. We aligned the guns on a narrow backbone designed to be lowered into the 30-foot-high cylindrical reactor. Wiring each gun together to function as one unit, we then cut the assembled system into six-foot sections for installation.

To "catch" the image we hung a cylindrical rear projection screen on the interior of the cylinder to be inflated against the reactor walls. Following this, each six-foot lighting section was raised to the top of the stage, reassembled and lowered into the reactor.

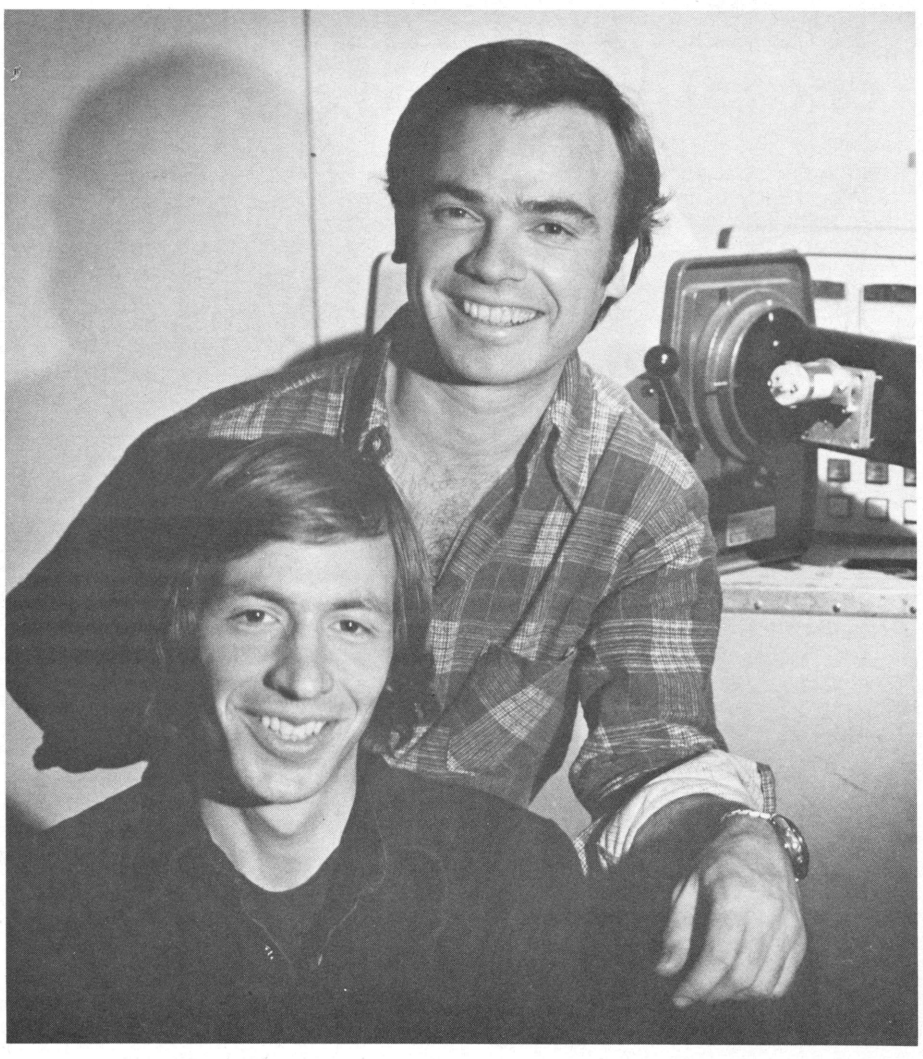
Although this process went smoothly, we encountered many unforeseen difficulties. As I mentioned, the soft rear projection screen posed a constant threat. At high running temperatures we actually finished a couple of shots hanging from ropes above the engine, hand-holding a quickly melting rear projection screen.

Another problem concerned viewing angle. A rear projection films best when the light source is opposite your camera angle to the projection surface. As the engine was to be filmed from almost every position, our projection angle had to change also. To compensate for vertical shift, we decided to rotate the lighting system within the engine. Together with Marty Bresin and Bob Spurlock (part of a great special effects crew who were a tremendous help throughout the film) we hung the entire system on a center of gravity, allowing the "reaction" to be easily turned within the cylindrical structure.

Concerning vertical shift, each light source within the reactor was given adjustable reflectors, allowing the imagery to be bounced to almost any angle.

As shooting in the engine room progressed, we found that the light guns not

Sam Nicholson (standing) and Brian Longbotham are partners in Spectrum Productions, a company producing special visual effects for film, television and commercial applications. Assigned by Robert Wise to create unique "organic" light effects for STAR TREK—THE MOTION PICTURE, they regarded the spectacular feature production as their greatest challenge yet.



only worked in the engine itself, but also as reactive lighting. Cinematographer Richard Kline, offering his excellent sensitivity for dramatic lighting balance, encouraged us to animate the area surrounding the reactor with kinetic light. Working in conjunction with Dick we positioned guns to create ambient waves of light within the engine room and found this greatly enhanced the sense of power radiating from the reactor. As a result, the finished effect became a delicate balance of both kinetic and static set illumination surrounding a glowing reactor.

Brian and I were brought onto STAR TREK to solve the engine reaction problem. However, as the film progressed, so did our involvement in it. Within a week after the engine room wrapped we found ourselves shooting monitor effects. These were short, abstract films designed for rear projection on the bridge computer screens.

A typical problem: What does a computer do when it's being drained of all information within a few seconds? For these effects we shot everything from pools of mercury to laser kaleidoscopes. With the help of Associate Producer Jon Povill, we designed each screen to relate directly to the live-action, yet maintain a universal expression characteristic of abstract images.

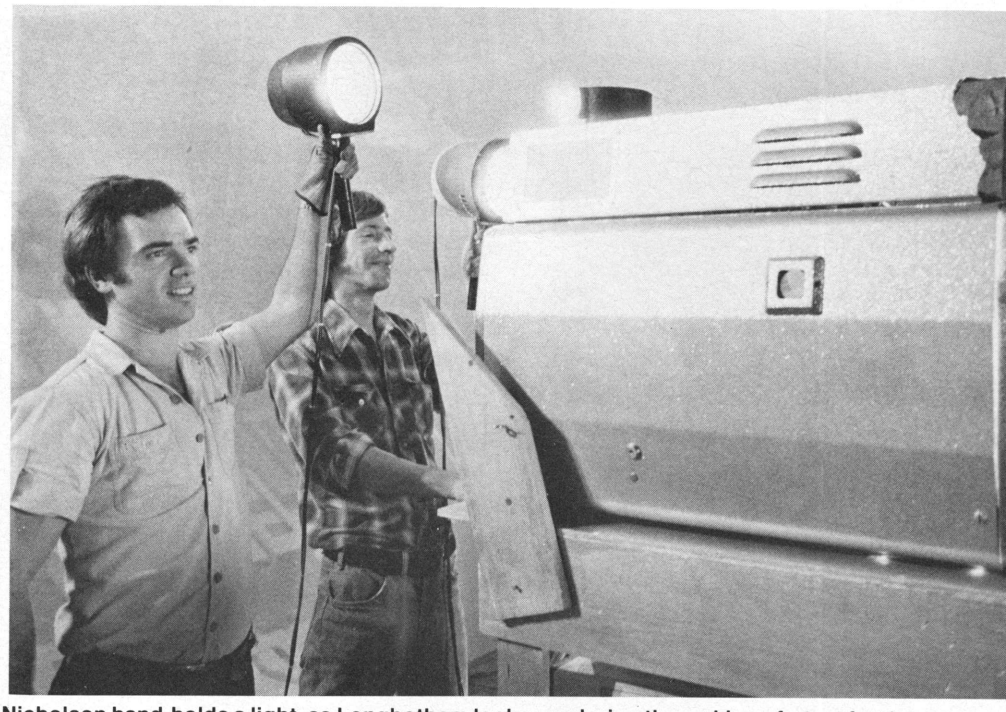
At this point we were about two-thirds of the way through principal production on STAR TREK—THE MOTION PICTURE with remaining time quickly shrinking. Due to unforeseen difficulties involving the numerous effects sequences, the schedule was slipping with no solution in sight for the climactic Voyager ("V'ger") sequence at the end of the film. V'ger (a colossal foreign vessel which "swallows" the *Enterprise* earlier in the film) was to become outraged during this sequence, eventually threatening to destroy Earth.

Kinetic light had been very effective in the engine room so Brian and I theorized another system for V'ger's "brain hemisphere". Working closely with Production Designer Harold Michelson and Art Director Leon Harris, we developed a lighting system to coordinate directly with their set design.

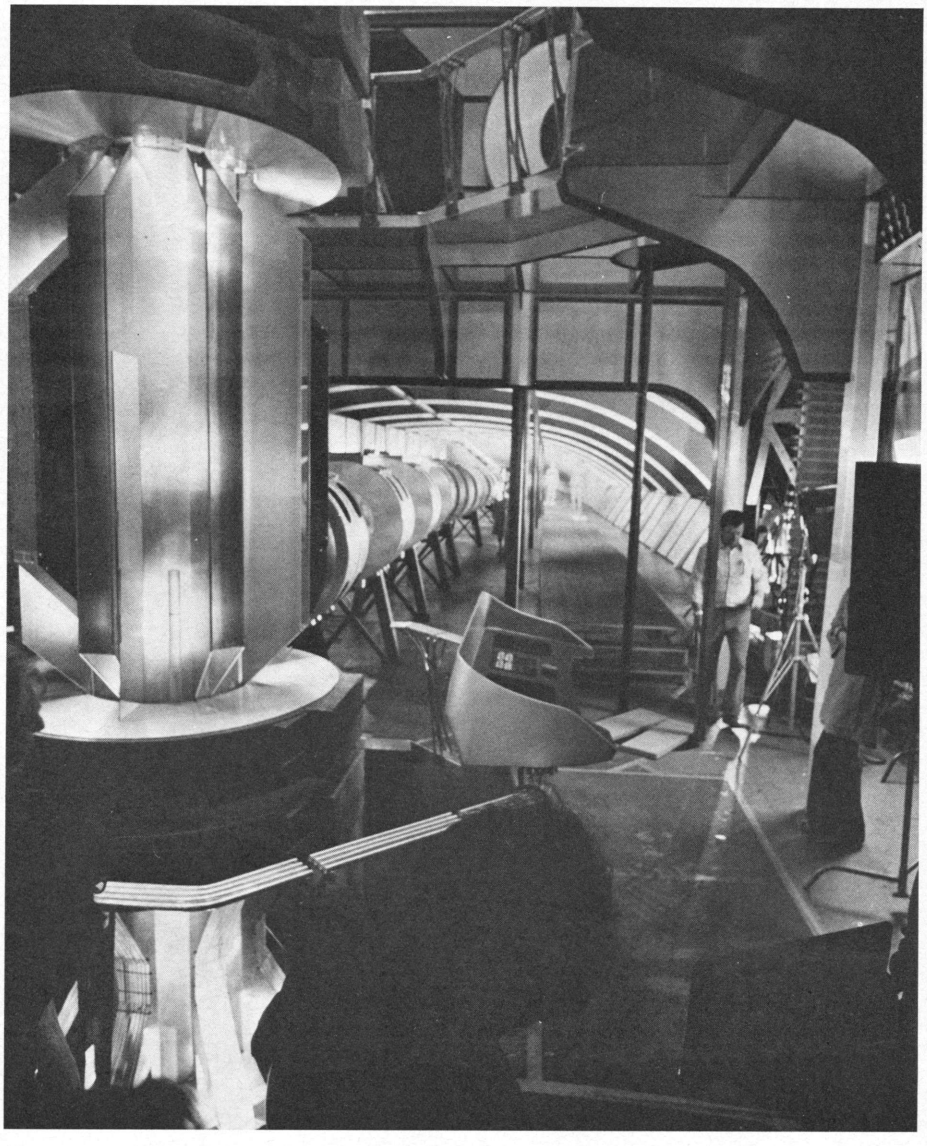
Harold and Leon, both tremendous artists open to bizarre schemes, designed the set to act as an enormous light projection surface. Their design centered around nine huge translucent towers from which channels of "energy" fed into the center of the set. Between these channels the floor contained thousands of small rear projection panels. Backed with opaque circuitry diagrams these panels were to enhance the detail of the huge "mechanical brain".

Our principal lighting systems were

Continued on Page 183



Nicholson hand-holds a light, as Longbotham looks on, during the making of a test for the STAR TREK feature. (BELOW) The engine room of the *U.S.S. Enterprise,* shown during a construction phase. At left is the three-story-high "matter anti-matter reactor" which Nicholson and Longbotham were assigned to "energize" in a unique manner. They used blue flowing light.



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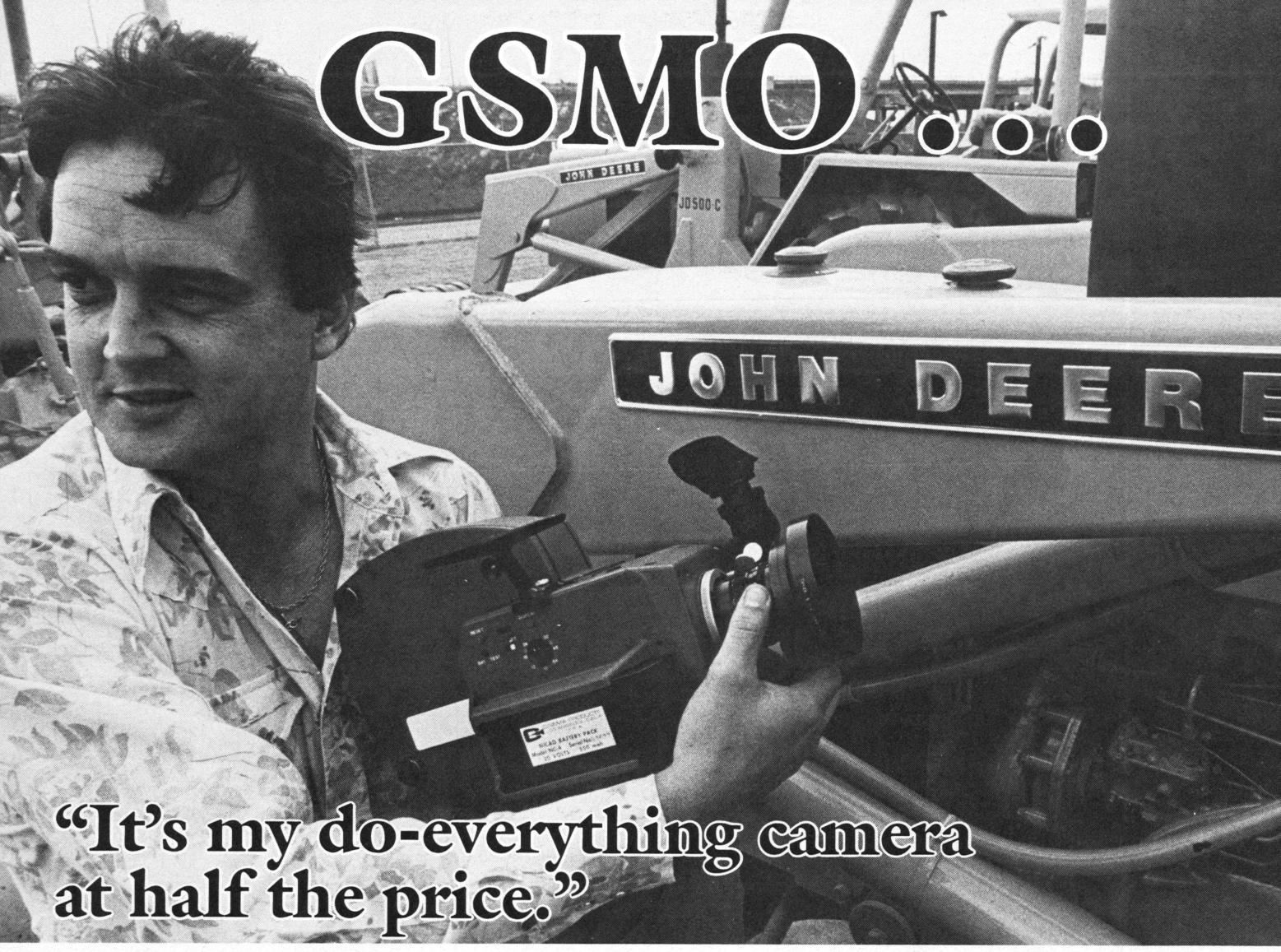

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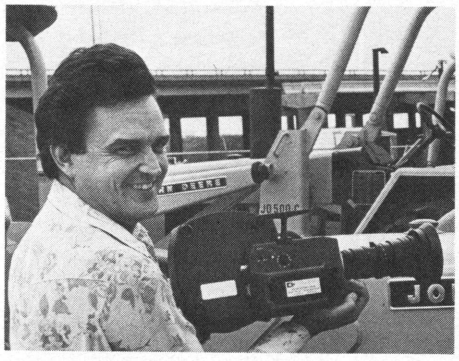

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THE MAGICAM MINIATURES CONSTRUCTED FOR STAR TREK THE MOTION PICTURE™

Constructing miniatures to look massive in space is the initial assignment of this new film and video special effects facility

By JAMES DOW

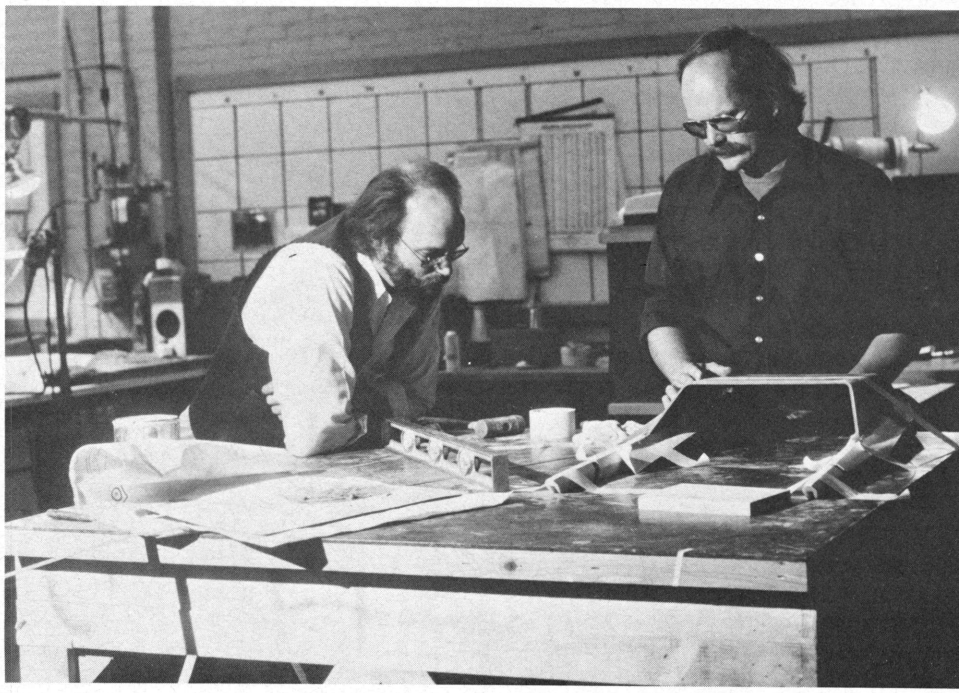
In September 1977, wrapping two years of work supervising construction and handling of the various miniatures for CLOSE ENCOUNTERS OF THE THIRD KIND, I was asked by Joe Matza of Magicam to set up a permanent facility which would grow into a well-rounded effects service available to both the film and video industries. I had been given an invitation to participate in the miniature work for Steven Spielberg's "1941", but decided to set up my "own" facility for Magicam.

Staffing from scratch, we pursued and landed the job of constructing the miniatures for the long-awaited Star Trek television remake and, with a small staff, began construction. First models were Drydock, V'ger and Klingons. The *Enterprise* was in the hands of the builder of the original *Enterprise* (we were happy—for on a tv schedule we couldn't handle any more work, as I was still looking for personnel). Three hectic months passed, and the miniatures were nearing completion when we received word that a hold was placed on everything. This was December, and we proceeded to tred water while the brass decided what to do with the project.

In January, we were notified that the production was now FEATURE and that Bob Abel had been hired to do special effects. Until now, we had been working with no script, director or special effects director. I had worked with Bob years before in Burbank when he set up his first slit-scan machine, so was familiar with him and respected his talents; we were very happy to be part of what promised to be a hit.

We had just completed the move to our new 12,000-square-foot facility near Paramount and were still setting up machinery. We began a new search to augment our thin staff of talent—the normal trial and error hirings consuming much in time and materials.

Abel's group proceeded to redesign everything, and all the television miniatures were wrapped up and packed away. A look was taken at the *Enterprise,* and it was decided that it, too, should be brought to our shop to keep everything (at least for now) under one roof artis-



Richard Taylor and Jim Dow discuss the design of the Vulcan Shuttle. (BELOW) Chris Crump works on Space Office model detail piece. The models prepared for STAR TREK—THE MOTION PICTURE by Magicam included (initially) the Drydock, "V'ger", the Klingon spaceships and, eventually, the starship *U.S.S. Enterprise.* Several previously built models were discarded.

tically.

Spring 1978—we now had assembled a competent staff and proceeded to wade through the extensive redesign stage. I think Bob was also assembling his staff at this time, and there was a great deal of confusion as to who was doing what. We began with the Klingon spaceship, as we had the 18-inch model from the original television series which had been loaned back to the production by the National Air and Space Museum. The basic form remaining similar, we began to make patterns and take measurements of the original, and a set of drawings was produced and blown up to eight feet then dropped back to four feet when Abel decided they would never be able to get far enough away from the model to photograph it.

It was decided that the six-foot *Enterprise* model, which had been built by Don Loos and existed at a stage of about 80% of completion, was to be discarded, as it was slightly under Bob's scale preference of 1″ = 10′. It was an enormously heavy model, having been built largely out of fiberglass with joint connections made of undersized aluminum sheet plates. Since the basic form had undergone little change, I set about designing an armature which would interface the new model with the still non-existent motion control shooting system. The need to support the model from any *one* of five positions, repeatably, was established. The cantilever nature of the starship's design necessitated a great deal of thought to its armaturing system and consideration for flex and repeatability of its positioning for the motion control camera. I designed a heliarced aluminum framework with the five-way mount located at its center of gravity.

Meanwhile, the patterns for the skins were beginning to take shape. Design changes continued to pour in from Abel's group—all of us nervous about offending the many fans of the starship *Enterprise*. To speed things along, a member of my staff, Art Center grad Chris Ross, and I began drawing a final set of *Enterprise* design changes, as we were getting close to a danger point in holding up production of the model.

A pleasing design was arrived at, and the drawings went to Richard Taylor's draftsmen for finalizing, and we proceeded with production of the skin molds working from prints of our drawings. (A real finalized set of drawings wasn't produced until after the finished model was delivered some nine months later and was accurate to this model.)

That was a beautiful set of drawings by David Kimble, a talented guy, and is the official set. There being as yet no camera system with which to shoot the models,

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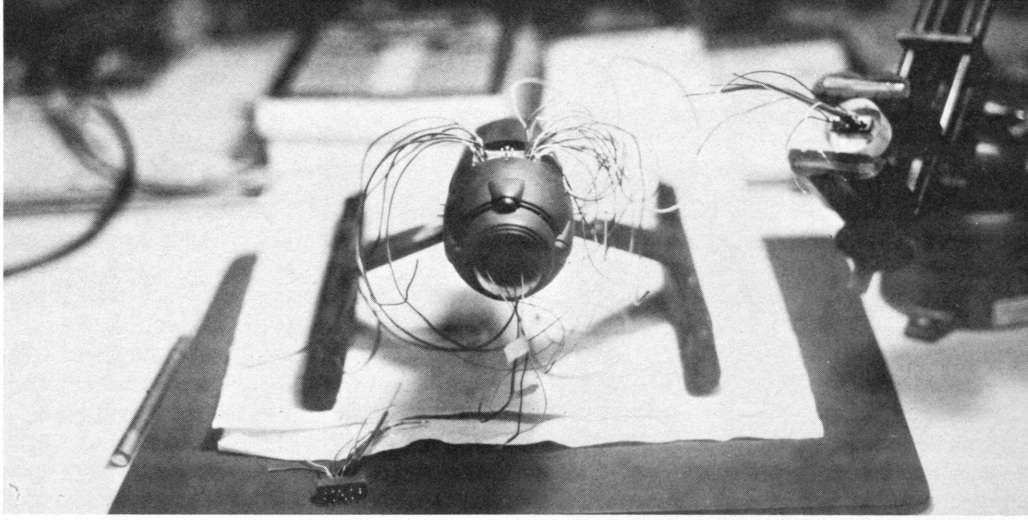
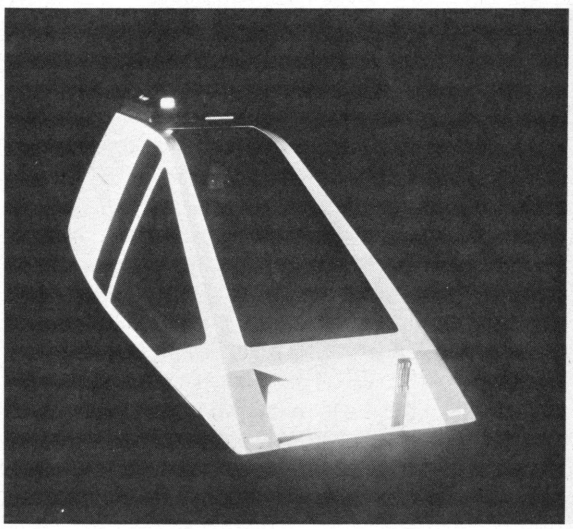
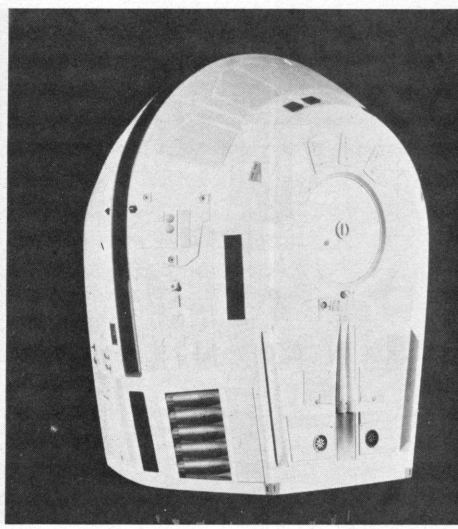
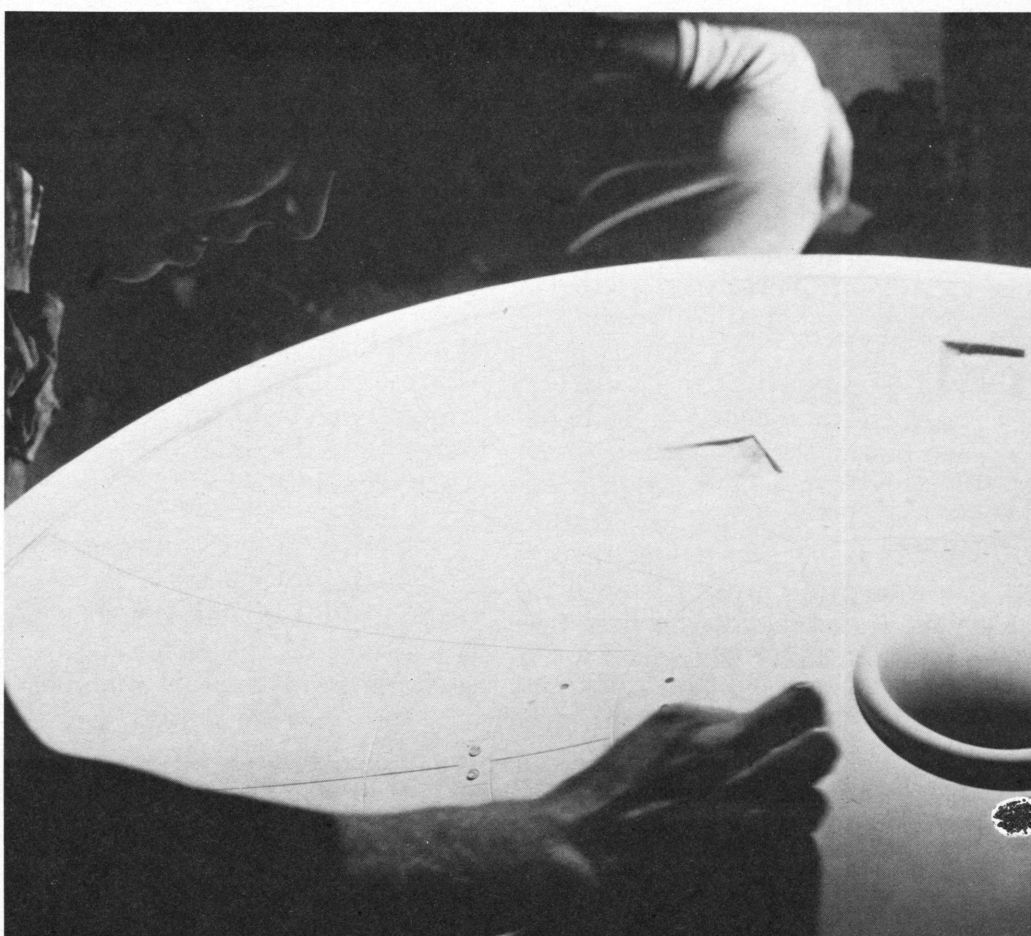


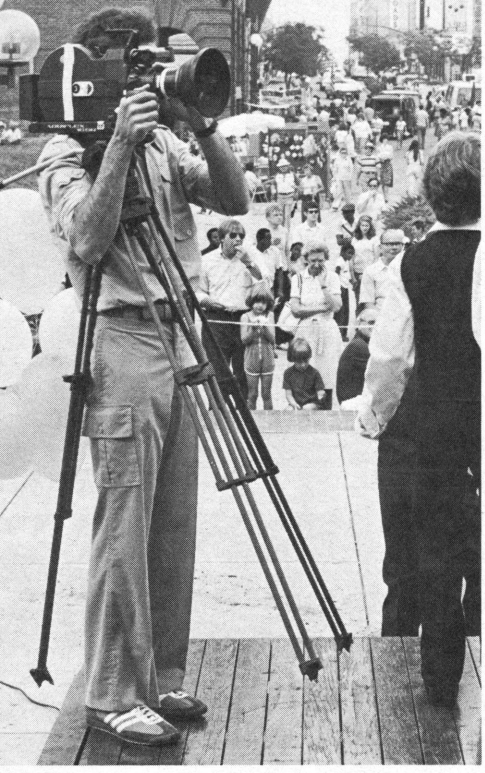
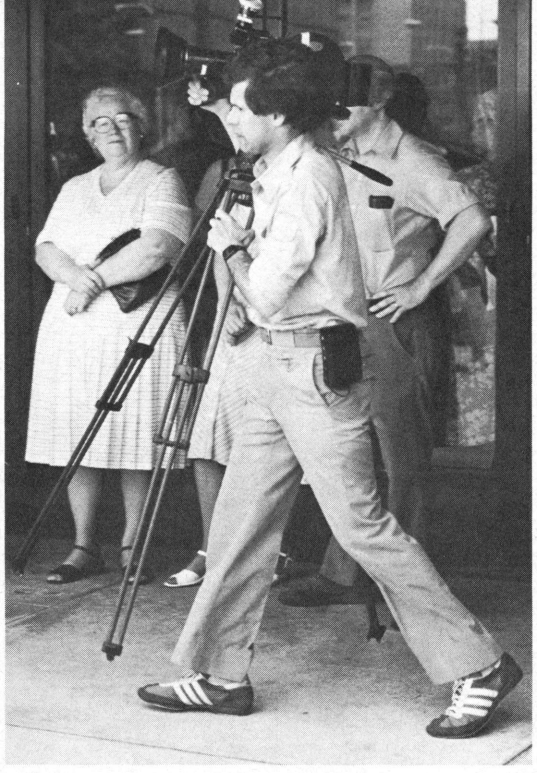
The WORK BEE model (scale: 2″ = 1′), a one-man work craft to be used in and around the drydock, was complete with interior and pilot. (BELOW LEFT) Travel Pod. The interior was complete with two doll figures and rear projection screen. (RIGHT) Space Office Pod enlargement model used for detail photography (scale: 2″ = 1′).





Richard Thompson detailing the main body segment of the *Enterprise* model. Surfaces were painstakingly prepared before painting to eliminate any imperfections. The builder of the original *Enterprise* model was initially scheduled to build the new model, but the task eventually fell to the Magicam group.



Shooting a documentary: quick moves. Camera rests comfortably on Mr. Fauer's shoulder as he hand-holds with tripod attached.

Hand-holding with the tripod on the camera! Jon Fauer talks about working with a Sachtler:

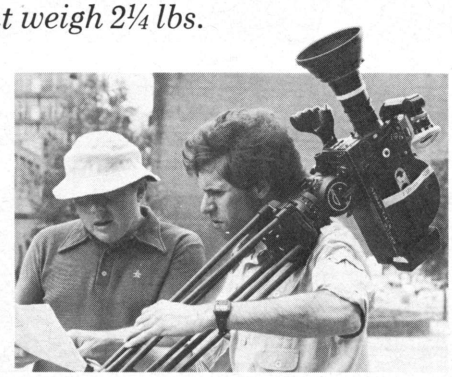
The effect on documentary style of a 6¾ lb. fluid head and carbon-fiber 58 inch legs that weigh 2¼ lbs.

"When the action isn't going to repeat and it's happening fast, you often have to go hand-held," says documentary cameraman Jon Fauer.

"But you give up a lot, of course. No steady long-lens closeups. No throwing the background out. Even staying wide, the image isn't really rock steady on a big screen. All these things you sacrifice for speed."

"I bought the Sachtler because of its incredible light weight with the carbon-fiber legs. After I began using it, I found I could make quick moves to a new angle carrying tripod and camera together. The Sachtler was the first tripod that didn't slow me down."

"The quick-release plate lets me go hand-held fast—and with the ARRI SR on my shoulder, the plate doesn't dig into me. I find I can put the camera back *onto* the Sachtler faster than I could with any other tripod."



"We spend half the time carrying the equipment around," says Jon Fauer. "Weight is important."

"Using my SR on other fluid heads, I was always fighting the counterbalance spring. Too much or too little. The Sachtler's adjustable spring gives me perfect neutral balance—with my 400mm *and* my Zeiss Superspeeds."

"The SR's tripod socket is fairly far forward on the base, and the Sachtler's quick-release plate is small. That's why it doesn't dig into my shoulder," says Mr. Fauer.

"The head is small, too. And this led to something I wouldn't have believed. In the heat of the moment, I found myself needing a hand-held shot *fast*. So I began hand-holding—*with the tripod still attached*! I forgot it was on there."

Who took the photos on this page—and why is that significant?

On this job, there was a two-man crew: Jon Fauer, cameraman, and his assistant, Jeff Laszlo. Usually, the assistant has his hands full carrying the tripod around two steps behind the cameraman. As you can see, Mr. Fauer carried camera and tripod himself. The pictures were taken by Mr. Laszlo.

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we began to request information about lighting parameters—what kinds, levels, sources would be preferred. Again, confusion reigned—no one could agree on the proper kinds of sources. All lighting developed for the previously constructed television model was rejected by Bob.

A look at the storyboards will provide answers to a lot of questions. As the Star Trek feature had no storyboards, we had to build the model for any of the possible camera angles from which it might be photographed, a 360-degree model. An armature would have to be provided to support it from any of at least five of the six major directions. Eliminating the top mount, we provided the following support: rear through the hangar bay, port side, starboard side, front behind the down range deflector and bottom, all mounting points centralized to concentrate the weight at the center of gravity; the armature was designed for lightness of weight and rigidity. The most difficult job was to keep the cantilevered saucer from sagging. In order to do so, it had to be as light as possible yet strong enough to support its own weight and lighting systems, while not flexing between camera passes. No one knew how or on what camera system it would eventually be shot, and when it came down to it, the model was simply overbuilt because of the confusion.

The basic armature ended up weighing barely 40 pounds, and the total weight of it with skins and detailing was under 70 pounds. Remarkable for an eight-foot-

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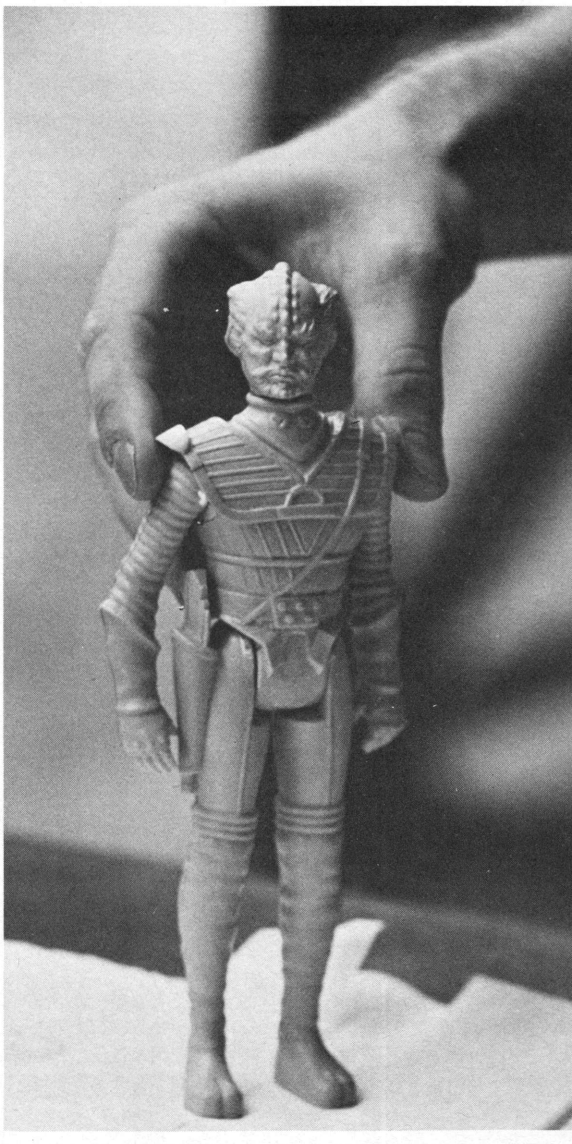


(ABOVE RIGHT) Plastic casting for a Klingon doll, a favorite of *Star Trek* fans, is checked at the Magicam facility. (BELOW) Injection mold tooling patterns for the South Bend Toys' "Electronic Enterprise" were made at Magicam model shop to insure accuracy. For years toys have been a lucrative spin-off from the TV series.

SPECIAL EQUIPMENT FOR FILMING STAR TREK THE MOTION PICTURE™

This unique production required custom-built cameras, mounts, lenses and electronic systems in order to achieve its very special effects

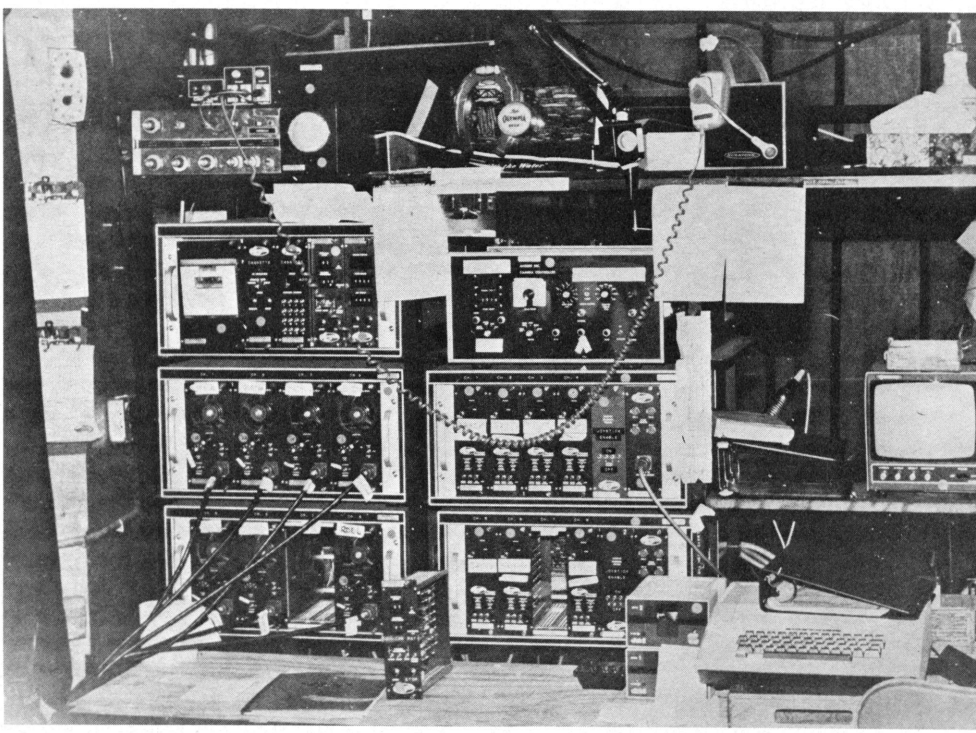
By SANFORD KENNEDY

In my capacity as designer and camera equipment builder, I had the opportunity to build or modify much of the equipment used both at Maxella and Apogee to film special effects for STAR TREK: THE MOTION PICTURE. I worked up until two weeks before the picture was to be released to get out that "last shot."

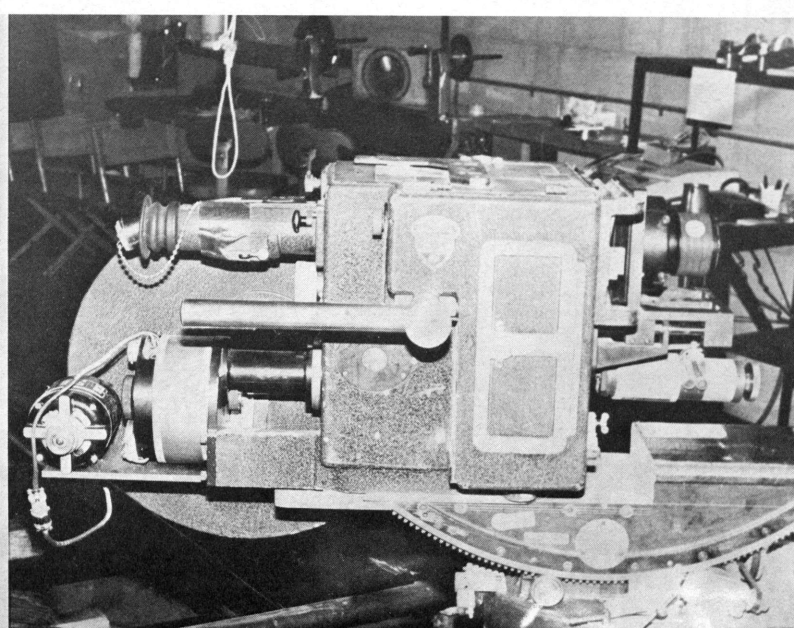
The special effects for STAR TREK: THE MOTION PICTURE were shot using two different film formats by two different special effects organizations. Doug Trumbull and his group at Maxella in Marina Del Rey used 65mm equipment for the close shots of the *Enterprise* and its space drydock, the V'ger interiors, and San Francisco of the future. John Dykstra and the Apogee group in Van Nuys used VistaVision (with 35mm film traveling sideways) for the shots of the V'ger cloud, the Klingon ships and the exteriors of V'ger. Many of these and other sequences by both groups were optically composited after duplication on a specially built 65mm-to-VistaVision printer. When finished this footage was printed down from VistaVision to 35mm anamorphic on a second specially built printer, using a Panavision lens.

The difference between the two formats is that the 65mm aperture measures 2.072" X 0.906" while VistaVision measures 1.458" X 0.991". Compare that to a standard 35mm aperture of 0.839" X 0.715" as used on the final anamorphic projection print. Both Trumbull and Dykstra have chosen these oversized formats in order to obtain the largest possible negative upon which to photograph the various visual elements. The greatest difficulty in terms of final image quality in any optical composite is the loss of detail and the increase in film grain size when dupes are made. Often seven or more separate pieces of film have to be printed on to one final negative. Additional losses can occur during the three-color separation process used with the Blue Screen to generate hold-out mattes.

All special effects equipment is subject



(ABOVE RIGHT) Apogee's motion-control electronics, designed by Al Miller at the Annex smoke room. This unit controlled the boom equipped with the "butterfly" camera. (BELOW LEFT) Paramount's all-magnesium case hand-held butterfly (VistaVision) camera with Mitchell viewfinder. (RIGHT) Mitchell VistaVision studio camera on nodal gear head with Nikon lens mounted.



to a compromise between the limitations of budget on one hand, and the demand for the highest possible quality on the other. This time the crew was forced to run a race with the picture's advertised release date, which prevented some equipment from being finished before it was pressed into service. STAR TREK is the "star" example of this, creating an atmosphere where the special effects were expected to be done yesterday. Both special effects groups must be commended for working an incredible number of hours, seven days a week to pull it off.

Shooting methods and equipment requirements differed markedly between Maxella and Apogee. Doug Trumbull and his Director of Photography, Dave Steward, used three makes of 65mm cameras: Mitchell, Todd-A.O., and Panavision. All these cameras are pin-registered, using the Mitchell-style movement. Some of them were fitted with follow-focus bases and motion-controlled gear heads. These, in turn, were mounted on different carts, and towers which ran along linear bearing tracks. The electronic motion control units varied in configuration, some using disc and others tape memory to achieve absolute repeatability.

Doug Trumbull favors Hassleblad lenses and has adapted all cameras to them. In addition he had Laikin Optical build a massive 32″ snorkel lens for super closeups. A special heavy-duty follow-focus base was designed and assembled for it by the author at B.G. Engineering, owned by Dave Gereaux and Don Trumbull, Doug's father. To support the large *Enterprise* model, the author built a 40″-tall model rotator that ran along its own set of tracks at right angles to the camera track. One of the problems inherent with the 65mm cameras is their tremendous size and weight, which can easily exceed 120 lbs. when set up for stop-motion photography.

John Dykstra and the Apogee group

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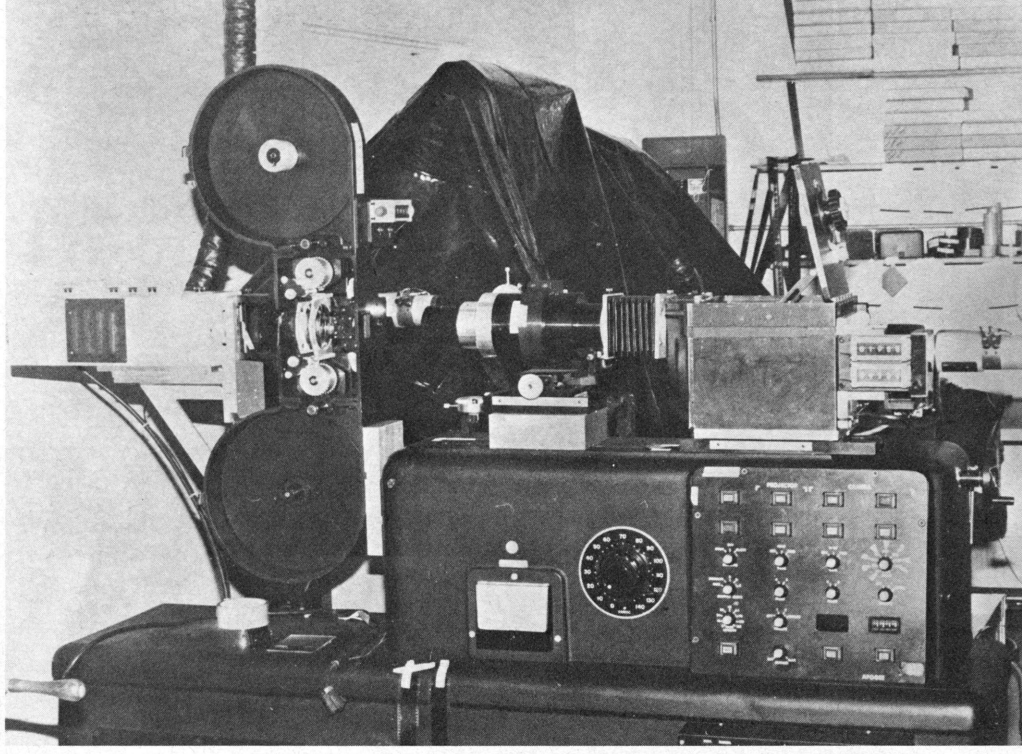
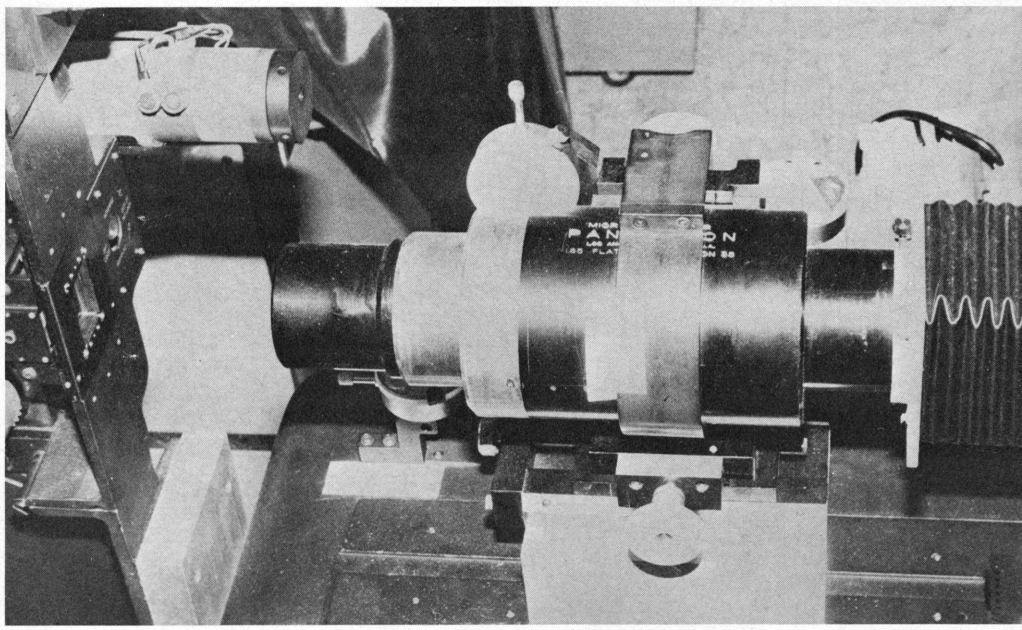
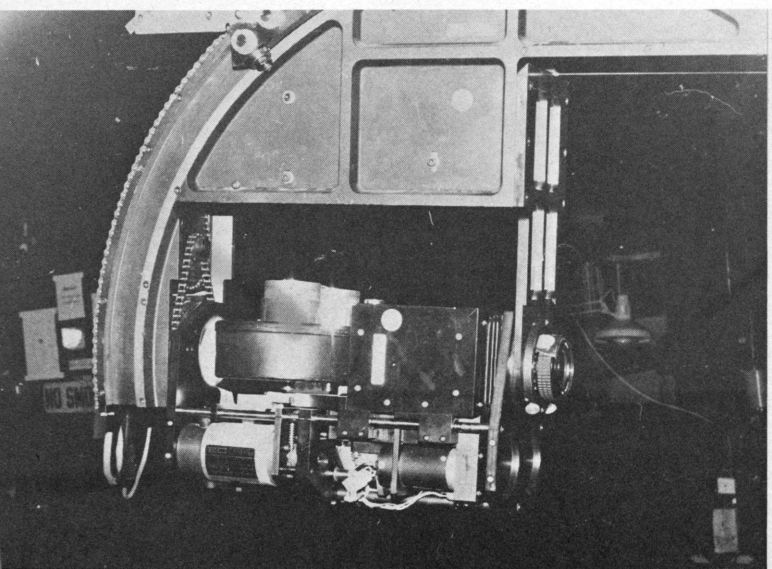
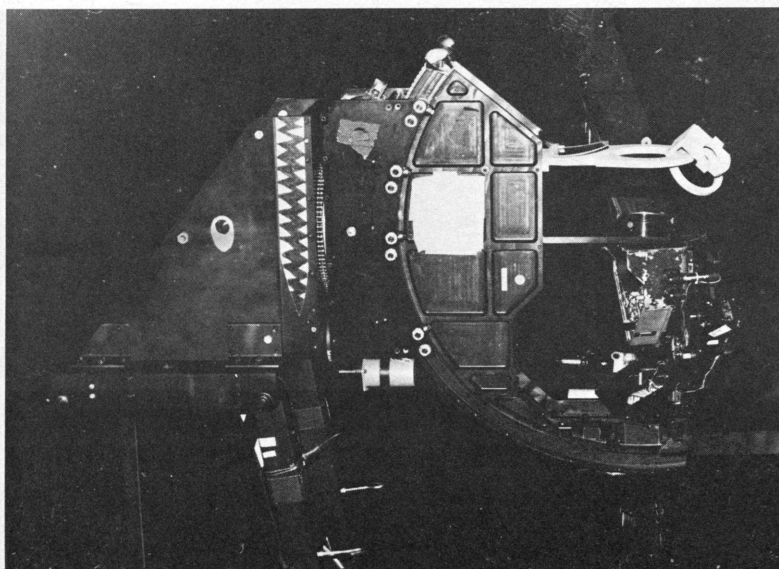


Specially built VistaVision to 35mm anamorphic optical printer used to print down effect footage originally shot in the 8-perf (horizontal) format. (BELOW) Panavision modified anamorphic printing lens. Doug Trumbull's organization shoots in the 65mm format, while John Dykstra's group prefers to use VistaVision. Both formats were combined successfully to create the stunning effects for the STAR TREK feature.



(LEFT) The Vista Flex camera on its nodal gear head. The term refers to two new boom camera systems at Apogee designed by Don Trumbull. The camera is custom-built by the author and crew at B.G. Engineering, and features a tiltable lens mount with D,C, servo follow-focus that moves the film plane relative to the lens to maintain nodal point. (RIGHT) Nodal point fo Boom #2, with a butterfly camera mounted. (The teeth consumed a lot of V'ger test footage.)





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Whatever position you bend its finder to, the 16SR's image is always upright and correct left-to-right.

Three-way rotation

The finder swings over from one side of the camera to the other—190°. It also rotates 360° parallel to the camera's side. And it swivels 25° *out* from the camera's side.

Key to versatility: symmetrical design

On most reflex camera designs, the mirror/shutter is mounted to the right of the aperture and the finder to the left. On the 16SR, the mirror/shutter is below the aperture and the finder is above.

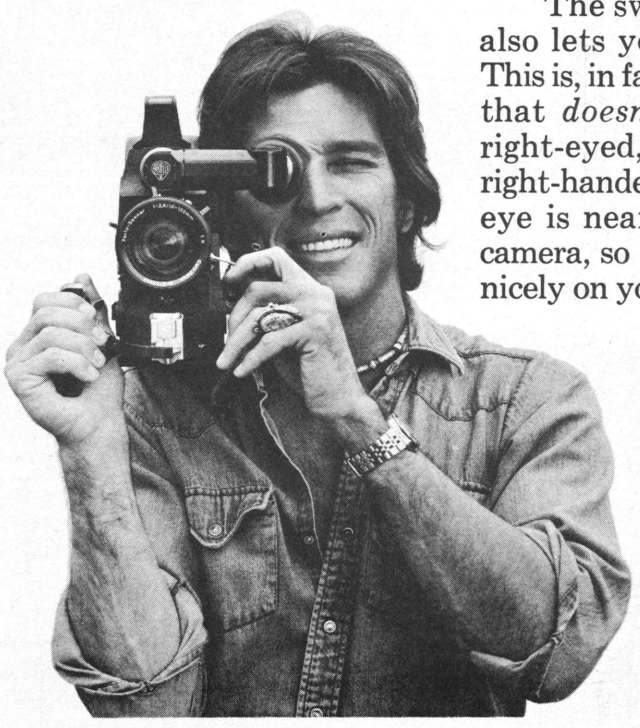
Ambidextrous

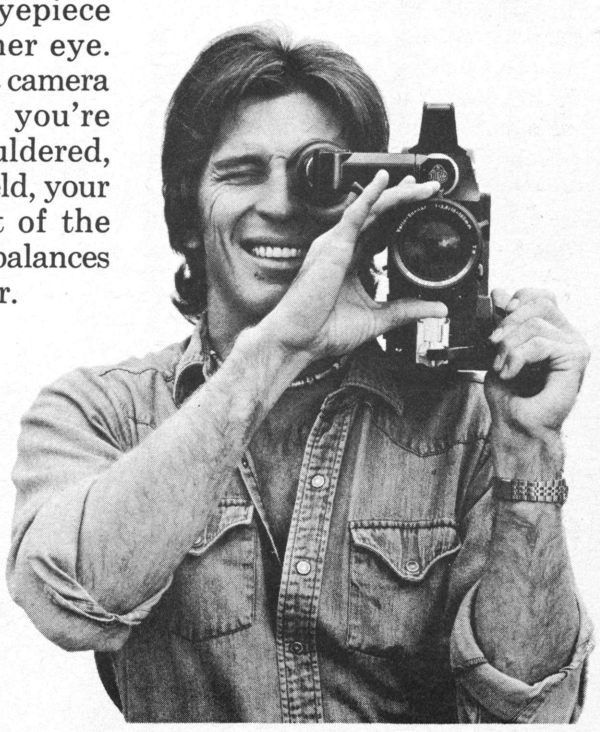
So the primary optical path is vertical, instead of horizontal. It doesn't favor the left side; it doesn't favor the right. And it's equally happy pointing straight up—or any angle in between.

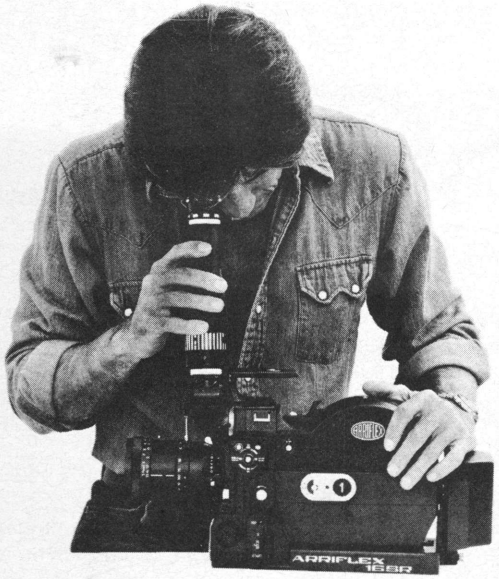
Adaptable

The swivel-out eyepiece also lets you use either eye. This is, in fact, the first camera that *doesn't* assume you're right-eyed, right-shouldered, right-handed. Hand held, your eye is near the front of the camera, so its weight balances nicely on your shoulder.

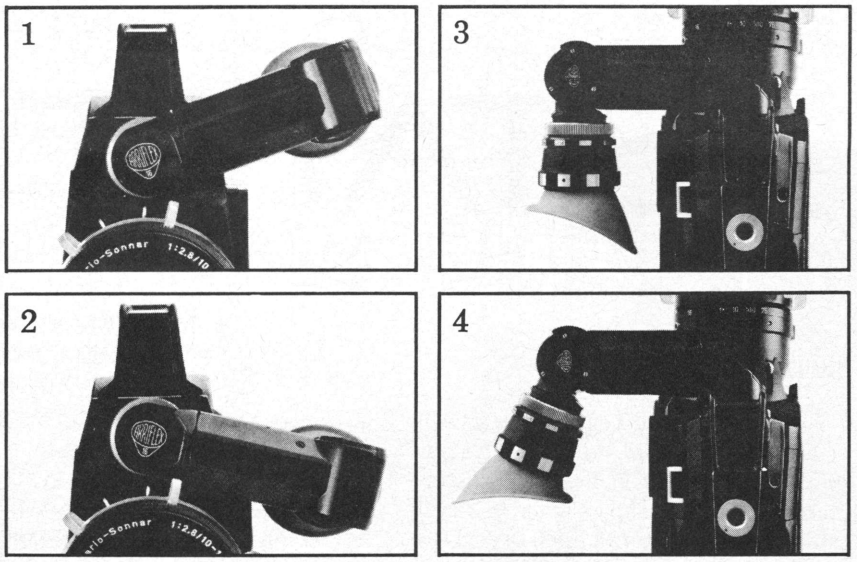
The seven-inch finder extension makes high angles easier. So does the shutter, which always stops open to the camera's viewfinder.







Steal candid shots by looking the other way.



Custom Fit
With the 16SR resting on your shoulder, you can adjust the height of the eyepiece (photos 1 and 2). And you can move it away from the camera's side (either side), to suit either eye (photos 3 and 4). Comfort.

Fiber focus screen

Compared with a groundglass, the 16SR's fiber screen transmits more light. Viewing is easier at low light levels. Edge-to-edge brightness is more even, too. And there's much less light scatter, and no groundglass grain. So image contrast is better and it's easier to see when you're stopped down.

Superspeed optics

To match the latest fast emulsions and fast lenses, the entire viewfinder system is a new, large-aperture design. The Zeiss lens transmits T1.3 to the film and the Arriflex finder transmits it to your eye.

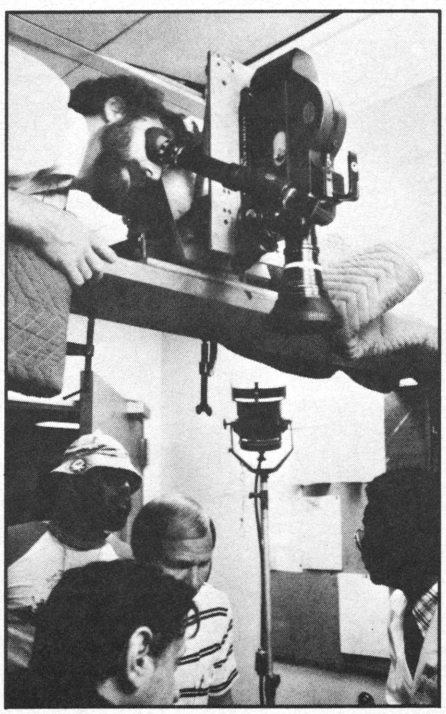
Big, bright image

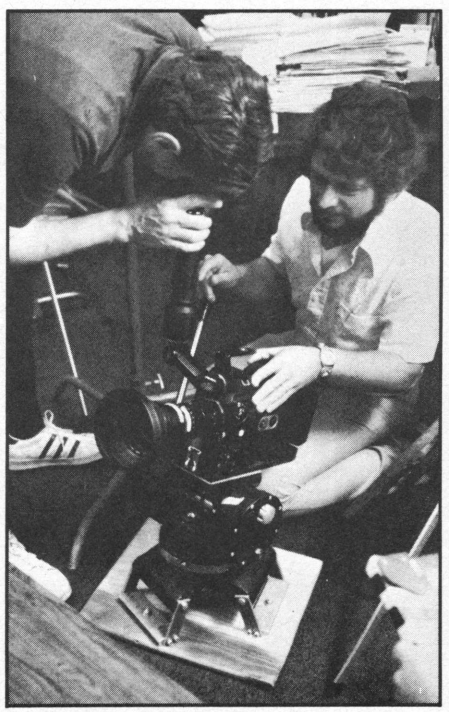
Moreover, the eyepiece image is magnified twelve times. All in all, the 16SR has the brightest and the sharpest viewfinder image available in 16mm. *Helpful.*

Video monitor

In the photo at left, you can see the Video Adapter mounted on the 16SR's right side. It's easy to attach. On the left side, you view the reflex image normally. The video pickup runs on 12VDC and 110VAC; and it works with most standard remote TV monitors or videotape recorders.

Faster setups
Wherever you put the camera, you can quickly see the shot — and so can the director.





16SR at work: left: Jack Cooperman; right: Jack Green. Photographs by Ron Grover.

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SYNTHESIZED SOUND EFFECTS FOR STAR TREK THE MOTION PICTURE™

The requirement was for a series of sophisticated sounds that had never before been heard on film (or Earth!)—and this crew produced the goods

By DIRK DALTON

Hard-core science-fiction buffs, as well as veteran "Trekkies", we at Media Masters Inc. were not in the least disappointed when we were called in to assist the post-production effort on STAR TREK—THE MOTION PICTURE. As outlined by director Robert Wise and editor Todd Ramsay, our responsibilities were to include creation of the major sound effects, such as the "voice of V'ger," the "wormhole" effect, the "warp drive," and a multitude of others.

We had been working with synthesizers and extensive signal processing networks for many years, and were well suited to the task, both in terms of hardware and experience. Now working primarily on film and television projects, Media Masters Inc. in Santa Monica, California (formerly Dalton Recorders), has always been a well-established music recording facility, welcoming such luminaries as Fleetwood Mac, Barry Manilow, Shaun Cassidy, and others. Staff member Joel Goldsmith, who actively collaborated with me throughout the STAR TREK project, was also responsible for the superb synthesizer programming heard in the score of the sci-fi film, LOGAN'S RUN. Myself, Joel, and staff members Melody Shepherd and Elizabeth Black made up the basic effects team.

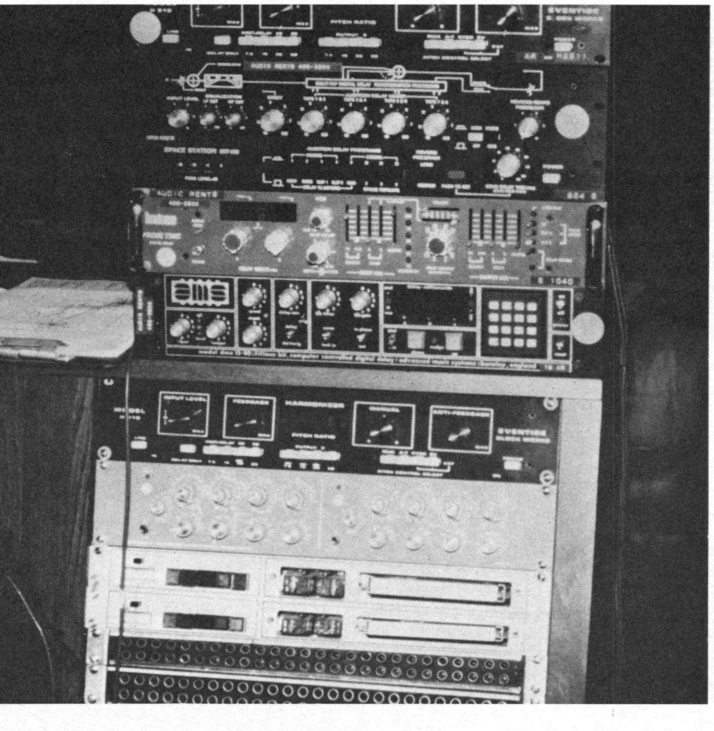
Sound editors Richard Anderson and Steve Flick emphasized their preference for "new" sounds that had not been exploited by earlier science-fiction films, and we agreed to aggressively pursue this objective. We resigned ourselves to the cinematic assumption that there actually are sounds in space, and plunged ahead.

In order to handle the tremendous variety of effects we needed to complete, almost all of the in-place resources of our 24-track studio were required, as well as a few outside items. The synthesizers in our standard set-up included an ARP 2600, a Mini-Moog, Yamaha CS-80 and CS-60's, and a Korg synthesizer and vocoder, as well as various synthesizer-related electronics, such as sequencers, frequency followers, and special interfaces.

All of the above were set up in our main audio control room. This room utilizes a Sphere Series A console coupled to an Ampex 24 track recorder with Dolby noise reduction. Mixdowns were to an Ampex ATR 100 2-track machine, also with Dolby. UREI Time-Align speakers did the monitoring, with the room third-octave equalized.

The control room also contains a great many sound modifiers, all of which were used on this project, sometimes simultaneously. These include the Lexicon 224 digital reverberator, the Lexicon PrimeTime digital delay, Systems Technology phasor and stereo flanging units, the AMS digital delay, a pair of Eventide Harmonizers, the ever-present Orban Parametric EQ, and the Ursa-Major Space Station digital reverberation, as well as other echo chambers, racks of

(LEFT) Some of the sophisticated signal processors used to modify the synthesized sounds for STAR TREK—THE MOTION PICTURE. (Top to bottom:) Harmonizer, Space Station, Prime Time, AMS Digital Delay, Harmonizer, Orban EQ and Dolby 361s. To produce the intricate sound effects required, all of the resources of the author's 24-track studio were required, as well as a few outside items. (RIGHT) Staff Engineer Elizabeth Black at the console.



(LEFT) Elizabeth Black sets up the microphone for the "Photon torpedo" pass-by, while collaborating synthesist Dirk Dalton (President of Media Masters, Inc.) holds the company fire extinguisher, pressed into service to provide the requisite *whooshing* sound. The sound, recorded outdoors at 2 o'clock in the morning, was okayed on the first take. (RIGHT) Ampex 24-track staff coordinator Melody Shepherd with Dolby M24.

compressors and expanders, and more. (The phasor listed above is not to be confused with those wielded by James T. Kirk and friends.)

As work progressed, we found that if the synthesizer effects could be performed while looking at the visual material they were supposed to match, the subjective realism of the product was greatly improved. So, to speed the creative process, we added an Audio Kinetics Qlock synchronizer and a three-quarter-inch video editing and playback facility. We discovered that, in terms of speed, ease of use, and accuracy, this system shows miraculous capabilities for related projects, such as music scoring, Foley, dialogue replacement, and especially final dubbing—for film as well as television.

Many people seem very interested in how the deeply-layered, soaring sounds of the *Enterprise* engines were made. The essence of the procedure was as follows: Over various carefully calculated periods of time, approximately 36 tracks (utilizing pre-dubbing to expand the 24 track format) of synthesized sounds were recorded, beginning with the more subtle, low-end vibrations, and moving toward the more audible high-pitched whines which are more crucial in terms of the overall perceived texture. As tape rolled, both the high-frequency filtration characteristic on the synthesizer *and* the tape speed of the recorder were varied in a prescribed fashion, which resulted, during playback, in sounds which, as time passed, grew higher in pitch as well as becoming more intense in high harmonics. Once these tracks were recorded, and initial pre-dubbing, or "ping-ponging" had left us a few open tracks, we began fine-tuning the effects.

The re-recording of individual tracks through various combinations of interconnected sound modifiers, with simultaneous and carefully planned level changes, proved to be an extremely useful technique. It not only allowed us to creatively tailor tone quality and application of special modification, but it also permitted improvements in subjective synchronization and stereo perspective localization, due to the synthesists' viewing of the synchronized video projection.

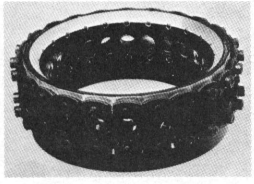
One of the most important subcomponents of the "accelerating engines" sound was created in this last phase: In small groups, tracks were rerecorded while being run through an Eventide harmonizer set to feed back into itself, as well as to raise pitch by two percent. This results in multiplication and transposition of incoming audio. The signal seems to slide up the audio spectrum as it is processed and reprocessed very rapidly, until the frequencies involved exceed the useful bandwidth of the harmonizer. This effect, superimposed in a number of different guises on the previously described tracks, formed the basis of our engine acceleration sounds.

A fire extinguisher, one of the less sophisticated pieces of studio equipment, was used to creatively solve a problem involving the "Photon torpedo" effect. Visually, the torpedoes seem to "whoosh" over the theatre audience, moving incredibly fast. We had relatively little difficulty finding appropriate sounds

Continued on Page 198

Collaborating synthesist Joel Goldsmith and staff coordinator Melody Shepherd take a break. Goldsmith's heart-felt groans were added to the *mélange* of sounds blended to synthesize the "voice" of V'ger in the final sequence of STAR TREK—THE MOTION PICTURE.

We have a head for pictures...



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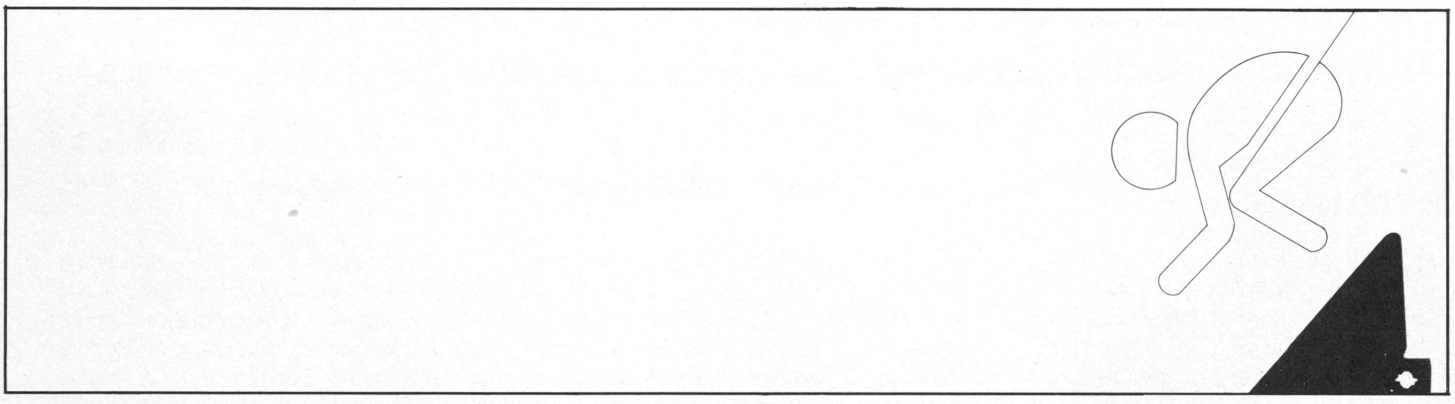

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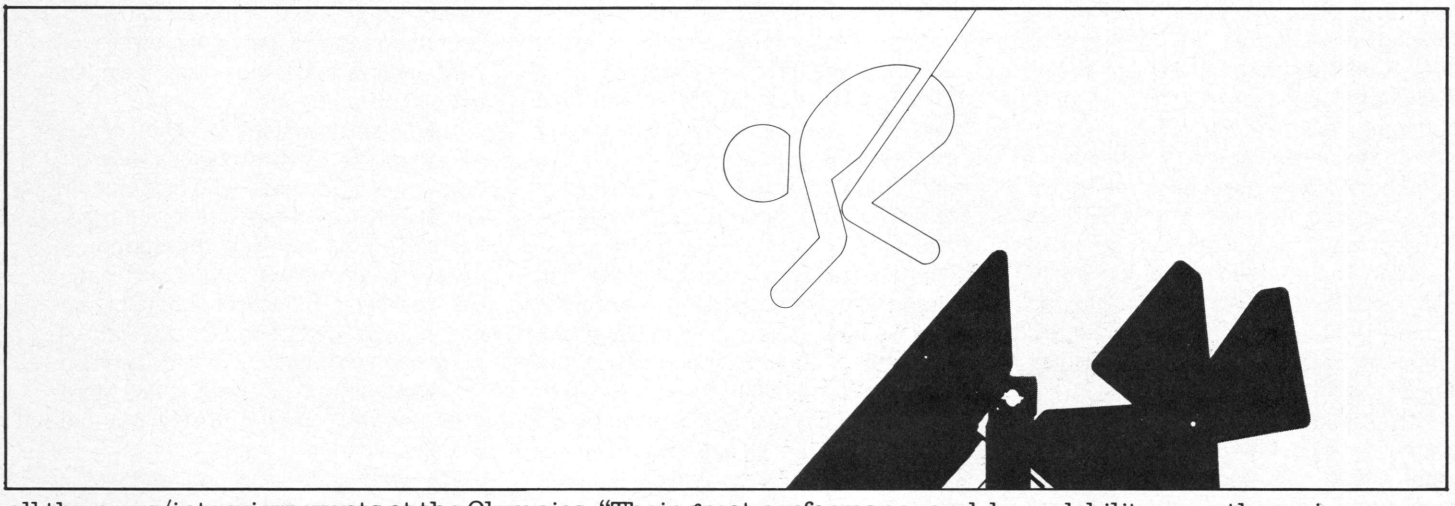
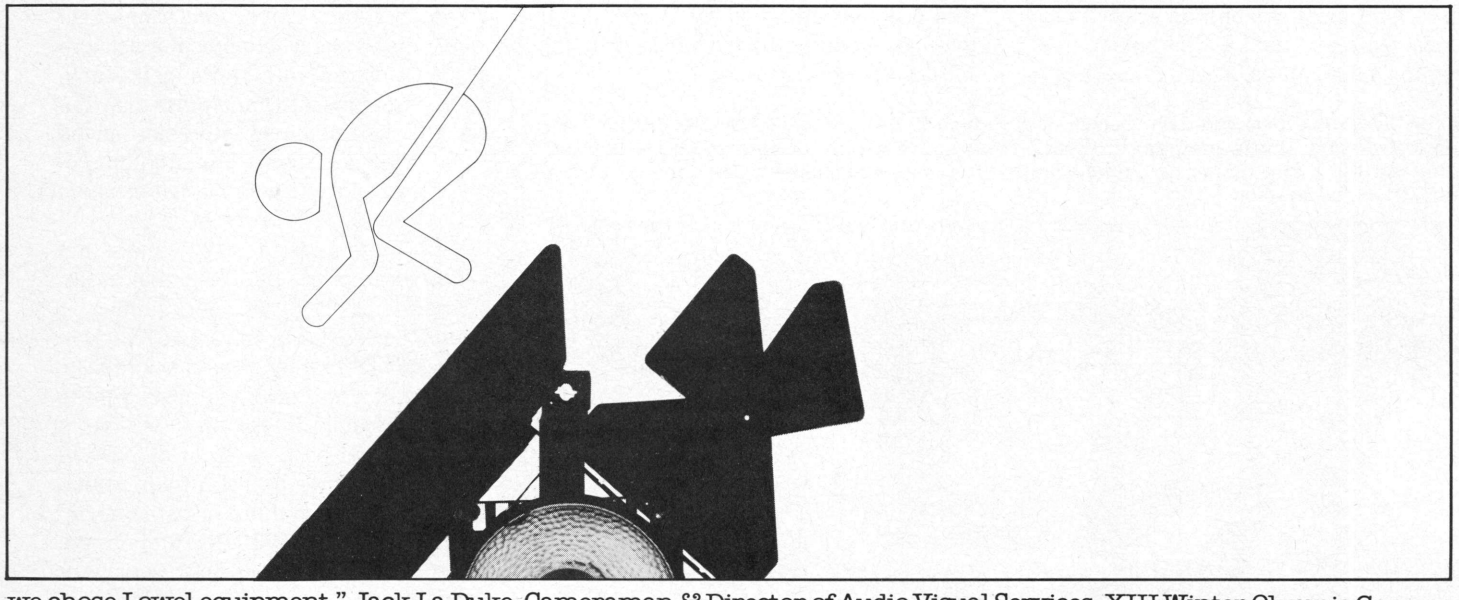


all the news/interview events at the Olympics. "Their great performance and dependability were the main reasons



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KNXT PROGRAM ON MARATHON RUNS AWAY WITH HIGHEST HONORS IN SPORTSCAST COMPETITION

A 30-minute program, produced by an independent documentary and entertainment producer for CBS station, wins top sports show award

By BOB FISHER

The first well-known runner was a Greek soldier who carried news of a great military victory at Marathon home to Athens 26 miles and 385 yards away. Upon arrival, he gasped out the good news, and died.

Today, thousands upon thousands of people are following in that soldier's footsteps, albeit with better results after arriving at the finish. KNXT, the CBS Television Network-owned station in Los Angeles, focused on the running phenomenon sweeping the nation in a 30-minute special that earned the Iris Award from the National Association of Television Program Executives (NATPE) as the best major market sports program of the year. The program was produced for KNXT by Dave Bell Associates, Inc., an independent documentary and entertainment program producer in Hollywood.

"KNXT's idea was to produce a program keyed to the Los Angeles Marathon," says John Cosgrove, who wrote, directed and coproduced the show with Bob Niemack, also of the Dave Bell organization. "We had worked with KNXT and other local stations on special production projects before. This time we had approximately three weeks to prepare a program for airing the same day as the event.

"A marathon is a sporting event evoking all kinds of drama, excitement and passion," Cosgrove says. "We thought the key to producing a successful program was finding a human angle, something the audience could easily relate with. We wanted it to be more than just another sports program documenting the action and results of an event."

The Los Angeles Marathon started at 8 a.m., on a Saturday. The last runner completed the course approximately five hours and 10 minutes later. "*Saturday Morning Fever*" aired at 7:30 that evening.

Approximately two-thirds of the film footage was produced before the race by three cinematographers from Dave Bell Associates. The film profiled four of the participants and featured interviews with medical and psychiatric practitioners offering insights and advice about running.

The profiles gave the audience someone with whom to relate. "The runners were shown as individuals with varying motivations and drives," Cosgrove says. The program also provided much useful information about what running does for (and to) people's bodies.

John Cosgrove (left) and Bob Niemack coproduced "SATURDAY MORNING FEVER", an award-winning sports program for KNXT-TV in Los Angeles. Cosgrove also wrote and directed the show, which combined filmed interviews with videotaped footage of the marathon action itself.

The remaining third of the sportscast consisted of videotaped coverage of the event. Two KNXT news crews worked with the producers, and all post-production was also done at the station, "While the marathon itself was a colorful spectacle, we banked a lot upon the performances of the four people we profiled," Niemack points out. "If more than one of them dropped out, we would have been hard-pressed to get the program we had envisioned on the air."

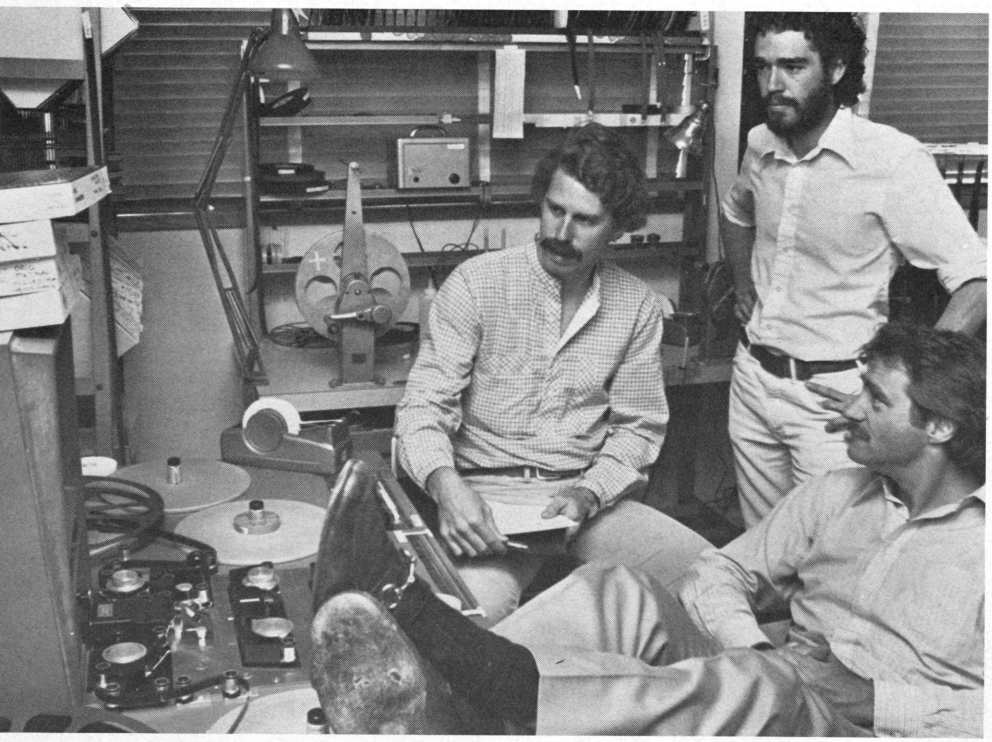
The first task was the selection of runners to profile. Several choices were obvious. Steve Edwards, who had recently joined the KNXT news staff as a daytime talk show host and weather reporter on the news, had run marathons in Chicago. He was selected as commentator, cohosting with KNXT sportscaster Jim Hill, in addition to participating in the race. Ken Moffit, the 1977 Los Angeles Marathon winner, was another obvious choice.

The third and fourth profiles focused on a woman running her first marathon, and a man who started running for therapy as part of a rehabilitation program while recovering from a heart attack. "We spoke with medical practitioners associated with running therapy, people from the AAU and other individuals and organizations interested in the field," Niemack says. "It is a tight community, so a lot of the same names came up."

Little more than a week before the event, three of the people profiled were doubtful starters. "We were starting to feel a little like the Greek soldier who ran the original marathon," Niemack recalls. Moffitt had a bad cold and missed three days of training. It was the first time in 496 days that he hadn't run at least 10 miles daily. Edwards, who hadn't been running more than three miles a day, injured his leg, and Barbara Hughes, the first-time Marathon runner, hurt her knee.

"She was told she couldn't run for six months," Niemack says. "For a while, it looked like the man who had recovered from a heart attack, Tom Tamanaha, was going to be the only one of our profiles actually running the marathon."

However, Moffitt and Edwards recovered, and the producer introduced Hughes to a well-known sports medicine doctor who got her up and running within a week. The profiles lasted only 2 to 2½



Coproducer Bob Niemack (left) and John Cosgrove (right) check film footage for "SATURDAY MORNING FEVER" with cinematographer Kevin O'Brien. The filmed segments of the program were combined with videotape of the Los Angeles Marathon. The program won the Iris Award of the NATPE.

minutes each; however, that was enough to give a sense of who was running, and why and how, according to Cosgrove.

The Moffitt profile was conducted by Edwards while they practiced jogging along the marathon route. Moffitt told how important running had become to him. "I would give up anything else first," he says. Moffitt told how he even runs 20 miles to the beach for relaxation on weekends. At the conclusion, Edwards suggested they both step up the pace to compare their relative running speeds. The result is a long trucking shot of Edwards quickly being left behind.

Three cinematographers were assigned to the program because of the tight production schedule. Wayne Threm and Kevin O'Brien are on the Dave Bell Associates Staff, and Bill Moffitt is a free-lancer who frequently works for the company. All of them used Eclair NPR cameras, recording double-system sound with wireless and shotgun mikes.

"We were moving most of the time, either from cars or on foot," O'Brien says. "The mobility of the cameras was very important. Most of the filmed portion of the program was recorded on Eastman Ektachrome commercial film 7252, a fine-grained color positive."

"The personality profiles really come through warm and human," Niemack says.

There was also a night sequence of Tamanaha running at an outdoor track where he started his running rehabilitation program. That needed more latitude, so Eastman Ektachrome video news film high-speed 7250 (tungsten) was used to record the sequence using the natural light from lamp posts around the track.

This runner told how the sport helped save his life. "I might have been dead by now if it wasn't for running," Tamanaha says. "This is going to be my third marathon. I am not concerned about winning. I just plan to finish."

For many of these interviews, natural sound played an important part in helping viewers gain a sense of the effort that goes into marathon running. Heavy breathing and pounding feet provided dramatic background for the pictures.

During the interview with Hughes, she told Edwards why she got interested in running the marathon. "I was always discouraged from participating in athletics as a child," she says. "I felt weak." Running the marathon would put that feeling to rest forever.

Edwards provided much of the continuity. He went to San Diego to interview a psychiatrist who uses running therapy with patients. The film was shot while the psychiatrist was running with a patient—Edwards interviewed both.

He, along with a champion female distance runner, also took a medical stress test recommended for new runners. Edwards and the woman took the tests which measured their pulse rates after extended exertion. A doctor explained that the pulse rate determines whether someone is in condition to start running, and cautioned that milder activity might be prescribed for many people at the start. Then he declared Edwards fit to compete, though not as fit as the champion runner.

Edwards also set the scene for the race by driving the course with a doctor who recommended that as a standard procedure for marathon runners. Like most marathons, the Los Angeles course has its own "heartbreak hill" toward the end. The doctor suggested Edwards get out of the car and try running up the hill.

All of the film was transferred to videotape for post-production several days before the marathon. "We left windows to fill in with videotaped progress reports on the four people profiled," Cosgrove says.

Logistics was the key to covering the race. "Based upon what we knew about them, we estimated where each of our four runners would be every 10 minutes," Cosgrove says. "Then we matched that information to benchmarks on the marathon course, including the five- and 20-mile points and, of course, the last hill."

Cosgrove and Niemack worked with two KNXT news crews operating Thomson ENG minicams from the backs of flatbed trucks. The Los Angeles Police Department provided a motorcycle escort for each truck so it could move freely along its scheduled route. "While we covered highlights of the race, including the dramatic start, the cameras concentrated upon the four people profiled as they progressed along the course," Cosgrove says.

Moffitt finished first in two hours and 36 minutes. "We were pretty happy with having picked the winner," he continues.

Hughes "hit the wall" at the 20-mile mark. The expression is runners' jargon for totally running out of energy. "I felt sorry for her," Niemack says. "However, this gave us a dramatic and up-beat scene. A police car drove her to the finish line where her husband was waiting. She was exhausted, but happy, and said she would be back again."

Edwards finished next to last in five hours and 10 minutes. But he had enough energy left to exchange quips with Hill at the end.

Tamanaha was right behind him. However, he couldn't have been happier. "Being alive and able to complete a marathon course was victory enough for someone who had suffered a serious heart attack," Cosgrove says. "It gave a lot of people something to think about."

In all, some 90 minutes of videotape was shot. This had to be edited to approximately nine minutes in individual small bites for insertion in the already edited program. The most difficult task

Continued on Page 192

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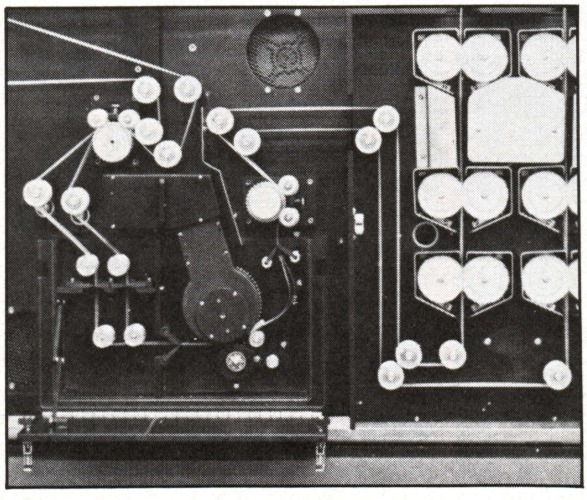

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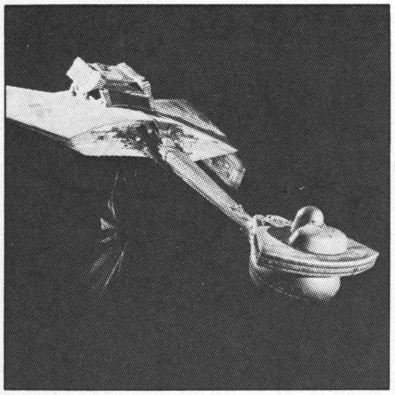

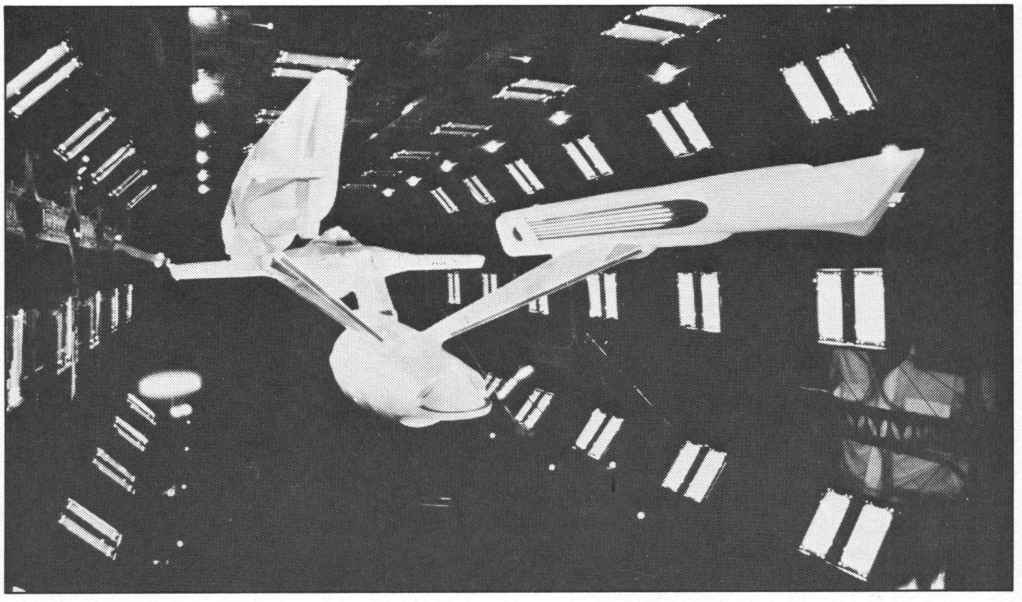

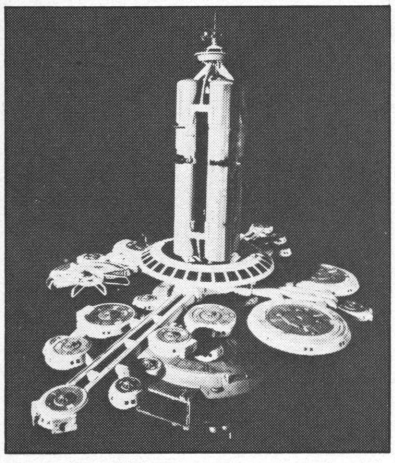

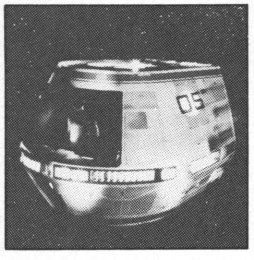

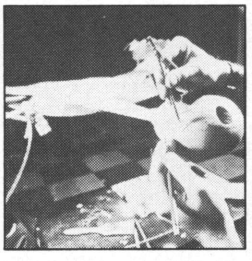

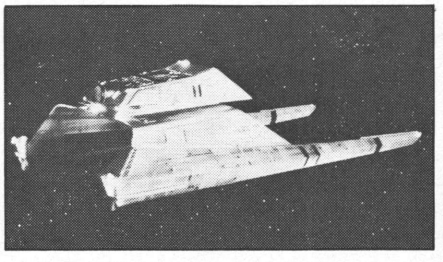

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PRESIDENT OF A.S.C. ATTENDS B.S.C. OPERATORS NIGHT

Not simply "hands across the sea", but perhaps the beginning of a much closer dialogue and cooperation between international cinematographers

By DAVID W. SAMUELSON, BSC

Perhaps the highlight of the year's events for the British Society of Cinematographers is "OPERATORS NIGHT", the night on which the leading Directors of Photography entertain their Operators and Camera Assistants at dinner and when the Society's Golden Camera Awards are presented.

This years event was especially memorable because William A. Fraker, President of the American Society of Cinematographers, travelled especially from Hollywood to London in order to attend.

He was a Guest of Honour indeed.

For Bill Fraker, and his lovely wife Denise, it was a very full weekend which also included dinner at the home of Freddie and Joan Young, lunch with the President and other representatives of the Guild of British Camera Technicians, visits to the Production Village (a new mini-studio complex) and Elstree Studios, and another evening reception where his fellow guests also included seven Oscar-winning British cameramen.

Operators Night is held every year in an old-world British pub, The Bull, at Gerrards Cross, when all active British Directors of Photography who are Members of the B.S.C. and are not abroad, away on location, shooting late or otherwise unable to attend, are traditionally expected to invite their crews to dinner and pay for all the drinks.

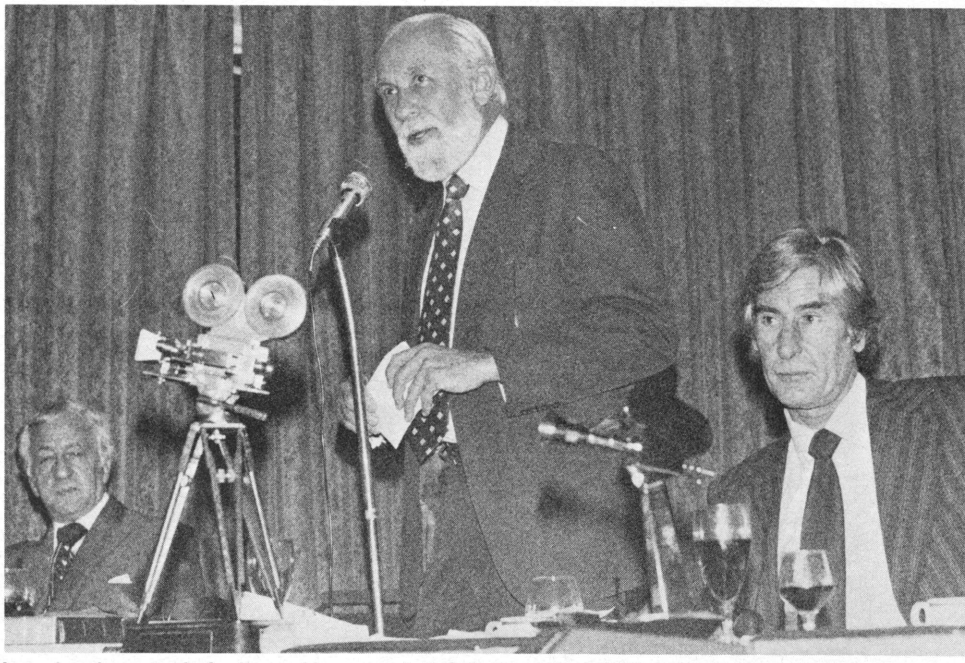
In all, well over 100 cameramen technicians attended.

Speaking after dinner in his usual witty and gusty style Bill Fraker said that during his term of office as President of the A.S.C. he has what he calls his "Master Plan" to bring all the leading feature film Directors of Photography of the world much closer together, both on a technical and on a "professional" level. He thought it should be possible nowadays, with easier and cheaper air travel, to arrange get-togethers in various centres throughout the world.

While Los Angeles, New York and London are the most obvious initial venues, he said he saw no reason why it should not be possible to meet with cinematographers from Australia, France, Italy and other countries where there are Directors of Photography of international standing.

He went on to say that he would like to see the status of the Director of Photography raised to that of an "Above the Line" talent. "The creative contribution of the Cinematographer is in no way less than that of the writer, the Director or of an actor or actress." He thought it should be possible for the Director of Photography to be contracted to photograph a picture in a given number of weeks for a certain total sum of money, any overage being paid on a pro-rata basis just like any other creative talent. "If we could achieve this" Bill Fraker said, "then it would be easier to achieve the next goal, the recognition that Directors of Photography of international standing should be a mobile labour force and be free to work

Continued on Page 199



In an uncharacteristically serious mood, A.S.C. President William Fraker speaks to members of the B.S.C. as Guest of Honour at their annual Operators Night. (BELOW) Gathered at the home of Mr. and Mrs. David Samuelson was a group that included seven Academy Award winners for "Best Cinematography". (Left to right, rear row:) Gerry Turpin, Walter Lassally, Alex Thompson, Alan Hume, Ossie Morris, Denys Coop, Billy Williams, Harry Waxman. (Front row:) Douglas Slocombe, Freddie Young, William Fraker, Jack Cardiff, Jack Hildyard, Robert Krasker. (In the foreground:) The genial host and hostess of the *soirée*, Elaine and David Samuelson.

THE NEW ARRIFLEX 16HSR HIGH-SPEED CAMERA

A much-acclaimed camera from Arnold & Richter now becomes available in a new model that will operate at speeds from 10 fps to 150 fps

The Arriflex 16SR camera continues to impress us with its rapidly growing range of important accessories. In its basic configuration, it is still one of the most versatile movie cameras ever built—and it can now apparently be equipped with just about every feature you'd expect to find on a sophisticated 35mm production camera. (The 16SR, of course, is 16mm.)

At the 1979 SMPTE convention in Los Angeles, we saw the Arriflex 16SR with video-assist, optical image-stabilizer, production matte-box, finder-extender, a complete follow-focus system for prime and zoom lenses, and a number of other goodies.

One of the most significant new Arri items on display was an entirely new version of the 16SR—the Arriflex 16HSR, the "H" signifying "high-speed." Now, when a filmmaker needs "high-speed," he can use the same camera for sync-sound *and* for frame rates to 150 fps. He needs no special spool-loaded film—and threading the magazine and camera remains quick and easy.

The Arri 16HSR operates at speeds from 10 fps to 150 fps, with the standard 12V on-board battery and utilizes the same variable speed control-unit as the standard 16SR. Speeds are continually variable—a significant advantage over the fixed increments on other high-speed units.

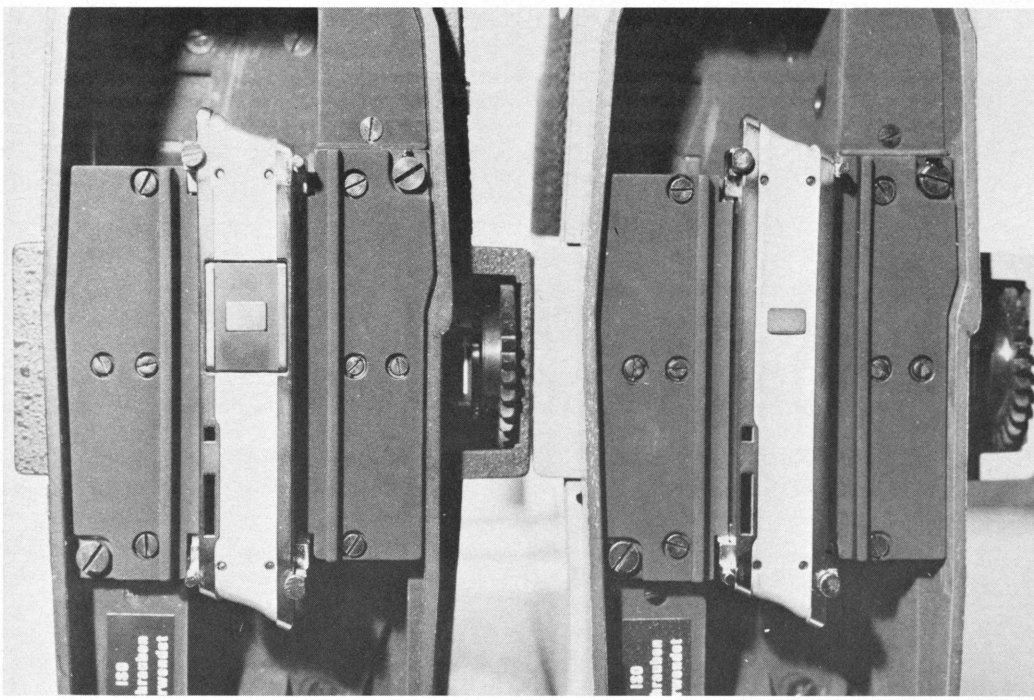
According to Arriflex, the magazines for the 16HSR use a different film channel and back plate, dimensioned for the changed dynamics of film at these higher speeds. They say there'll be a conversion kit available so you can modify existing 16SR magazines for use on the high-speed camera. All high-speed magazines can be used on standard Arriflex 16SR's but may not be as quiet.

The high-speed version has all the 16SR's features. The motor and drive electronics have been redesigned for the extended (doubled!) speed range. And yet the camera's estimated price is only about 10% higher than the standard 16SR. With all the features of the Arriflex 16SR packaged into a high-speed camera, this increase seems acceptable indeed.

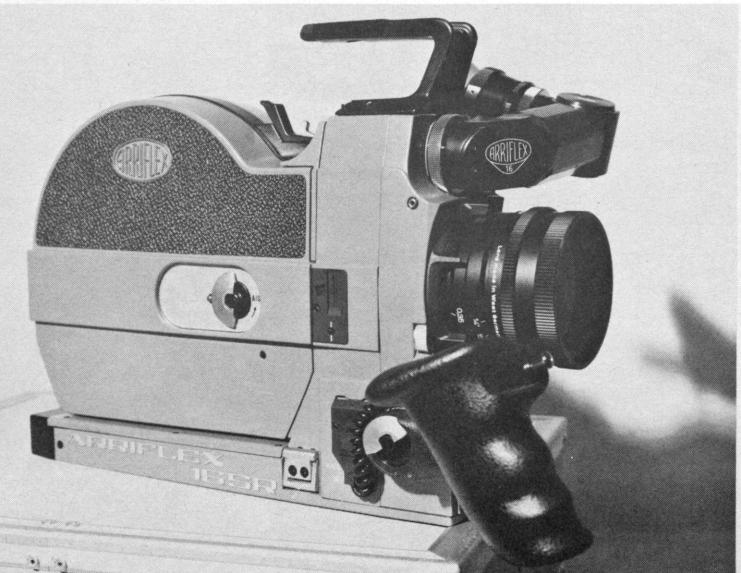
The camera's assured reliability, even at 150 fps, has been achieved with only a slight increase in operating noise level at all speeds. Arriflex reports that the operating noise of the camera at 24 fps, for example, is around 31 dBA. At 150 fps, the Arri 16HSR is by far the quietest of all high-speed cameras, according to Arriflex.

Possible applications for this camera abound. They range from sports and industrial documentaries to special-effects work and television commercials. In fact, the first sizeable group of 16HSR's is to be delivered to the Soviet Olympic Committee for the 1980 Summer Games in Moscow.

The Arriflex 16HSR will be available in the U.S. in the next couple of months. Based on what we saw, it should make a solid contribution to our craft. ■



(ABOVE LEFT) Film channel and back plate assembly of a standard Arriflex 16SR magazine. (RIGHT) Film channel and back plate assembly of the new 16HSR High-speed Arriflex, which have been dimensioned for the changed dynamics of film at higher speeds. A conversion kit will be made available to modify existing 16SR magazines for use on the high-speed camera. All high-speed magazines can be used on standard 16SR's, but may not be as quiet. (BELOW) Two views of the new Arriflex 16HSR.



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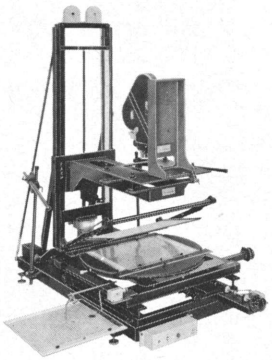

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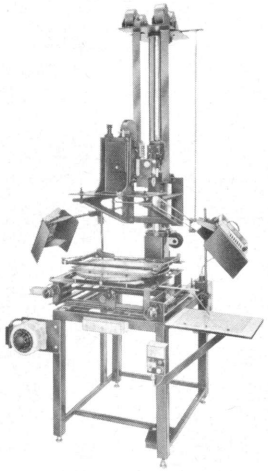

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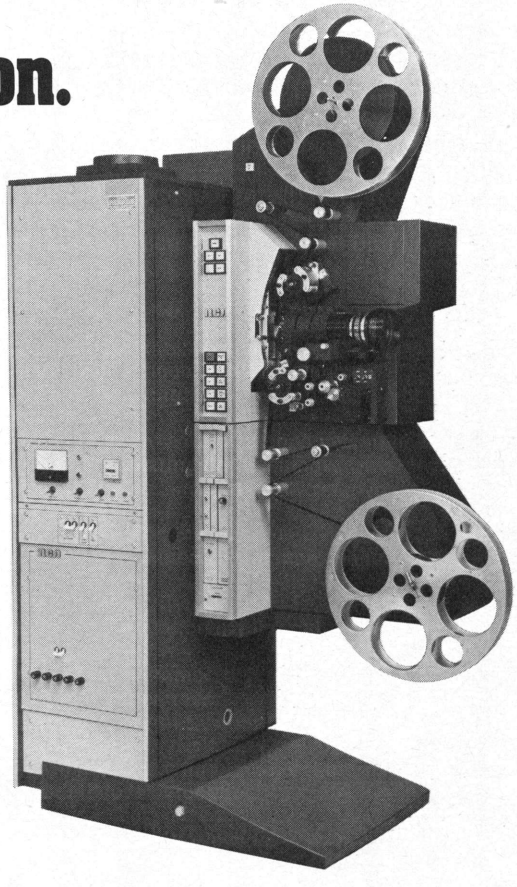
RCA's FR-35 DP Projector for large screen presentation. You should see it in action.



First it was the FR-35TV 35mm Projector with unique features for high quality film-to-tape transfers. It was a needed television post-production tool—an instant success.

Now RCA Photophone Systems introduces the companion product—the FR-35DP Projector for direct large screen presentations.

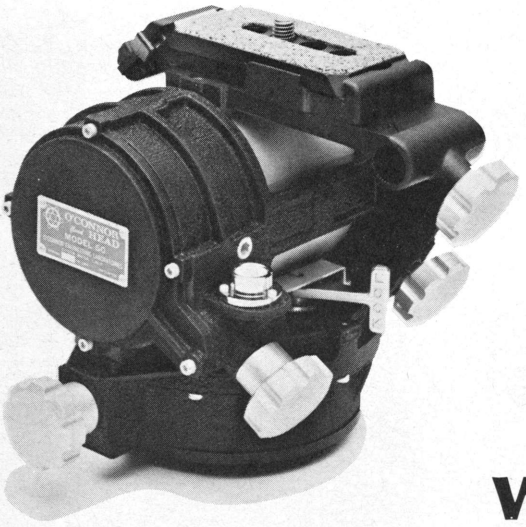
The FR-35DP adds a new degree of flexibility and efficiency to film post-production operations, with features such as these:

- New Xenon illumination system provides maximum reflection, excellent screen intensity and light distribution (750 W to 4500 W systems available).
- Operates at cine (24 or 25 fps) or 6 X cine speed, forward or reverse.
- Servo-driven pull-down with Electronic Registration.
- Superior picture stability—virtually no jitter or weave.
- Continuous speed sprockets and shutter are servo-driven for 2:2 or 2:3 pulldown (permits projecting "dailies" and making a video tape simultaneously for editing).

FR-35DP—*the* 35mm projector for critical large screen presentations. Another innovative, need-filling product from RCA Photophone Systems—the people with the broadest line of sound-on-film and sound-for-tape systems.

Ask your RCA Representative to give you the big picture on the FR-35DP. Or write RCA, 2700 W. Olive Avenue, Burbank, CA. 91505 U.S.A. Telex 68-6215.

RCA Photophone Systems



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The Model 50-D Fluid Head can be ordered with one of six different platforms. Each has its special features and purposes, but our newest is the ultimate.

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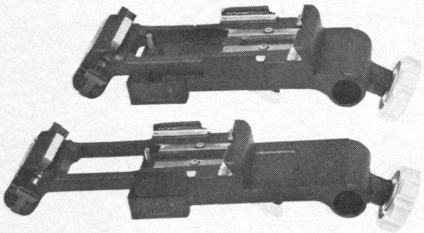
Besides an adjustable camera mounting plate, the entire platform (with camera atop) can be shifted

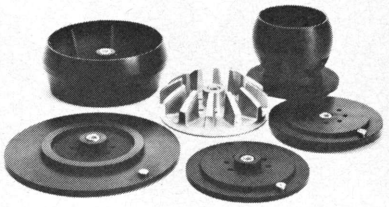


back and forth on the head so that you can find the precise center of gravity for whatever particular gear you're using at any given moment, such as heavy lenses, large magazines, etc.

It takes only a second to release your entire camera with O'Connor's new quick release option. To prevent accidental releases, it has a built-in safety feature.

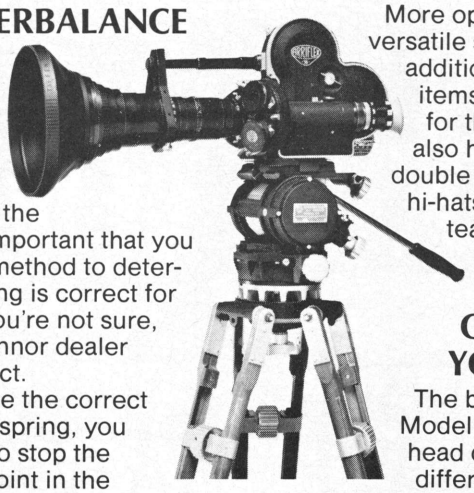
WITH BASES, WE'RE LOADED.

The Model 50 can be ordered with one of six bases. Besides two Pro Jr. types, Mitchell, Arri 16 and Arri 35, we also offer the O'Connor Claw Ball Base with the "ultra positive grip." The distinctive aluminum ridges



dramatically increase the holding power with far less effort needed to secure it in position. This Claw Ball design can also be adjusted ±15° to the horizontal plane within the top casting of the tripod to correct or alter your panning plane.

O'CONNOR COUNTERBALANCE DEFIES GRAVITY.



Three counterbalance spring options are available for the Model 50. It is important that you use the proper method to determine which spring is correct for your needs. If you're not sure, consult an O'Connor dealer or talk to us direct.

When you have the correct counterbalance spring, you should be able to stop the camera at any point in the normal tilting range and release the handle without the camera moving. And it should take no more effort to tilt it upward than it does to tilt it downward. We specifically design counterbalance into all our heads to correct this natural act of gravity so that your "tilts" are as steady as your "pans."

MORE CONTROLS FOR MORE CONTROL.

Like all O'Connor heads, the Model 50 is designed to provide maximum versatility. Separate controls for the pan drag, pan lock, tilt drag and tilt lock—all improve the flexibility and repeatability of camera movement.

O'CONNOR HAS MORE OPTIONS.

More options mean a more versatile system for you. In addition to some of the items already mentioned for the Model 50, we also have adjustable double video handles, hi-hats, cases, adapters, teak tripods and the ever amazing Hydro-ped.

ORDER IT YOUR WAY.

The basic O'Connor Model 50 fluid camera head can be ordered 378 different ways. If you're not sure how you want yours, maybe you should send for our brochure and price list to help you pick the equipment that's perfect for your needs.

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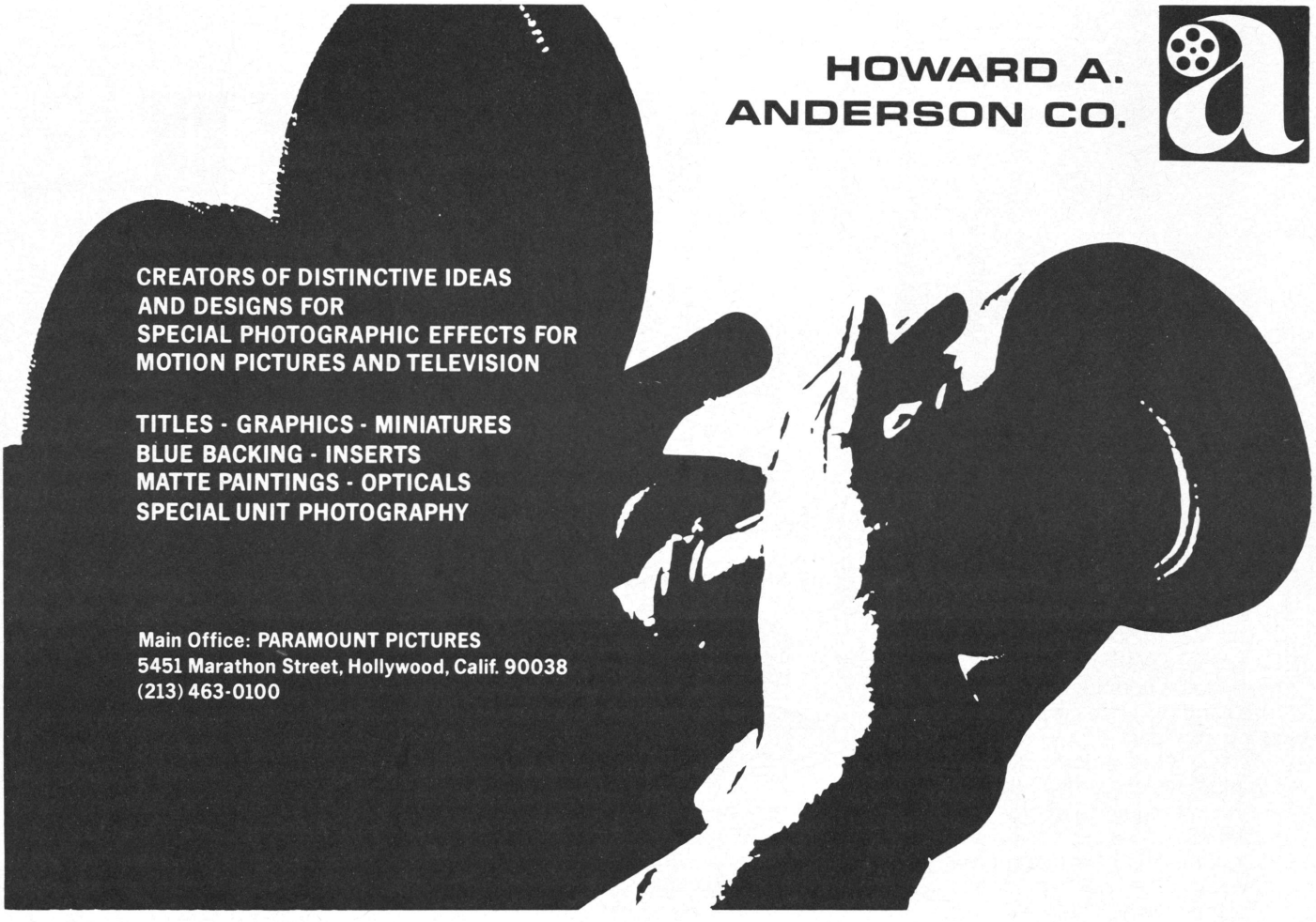

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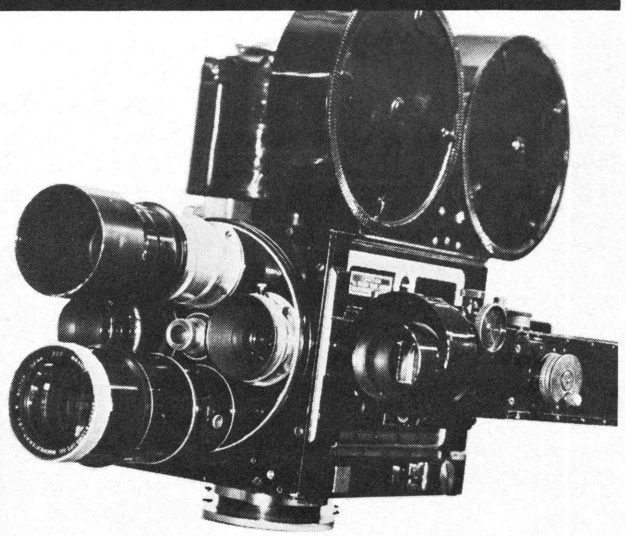

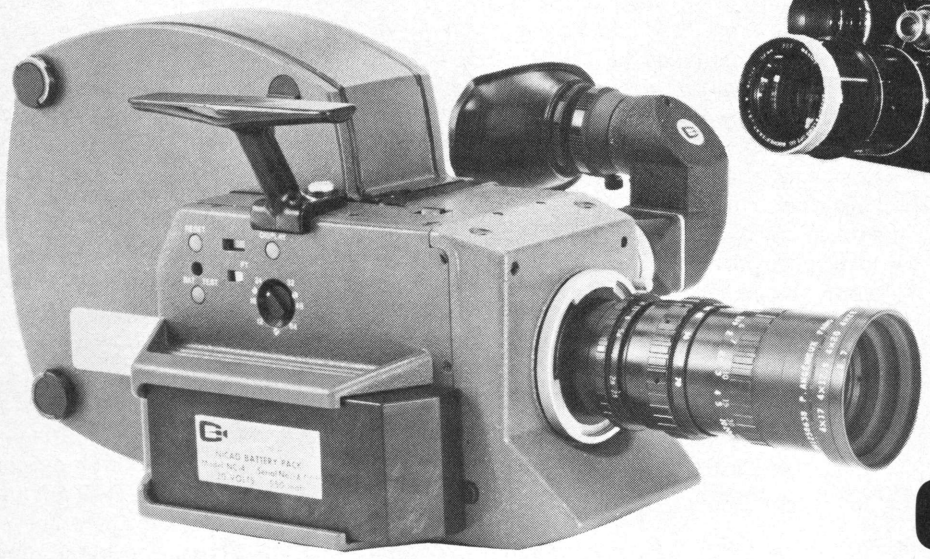

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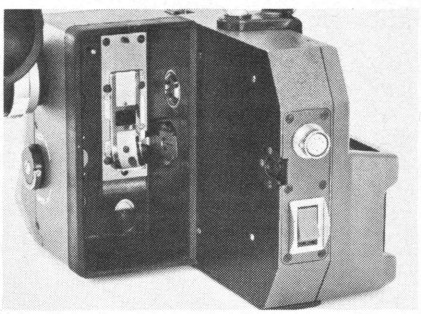

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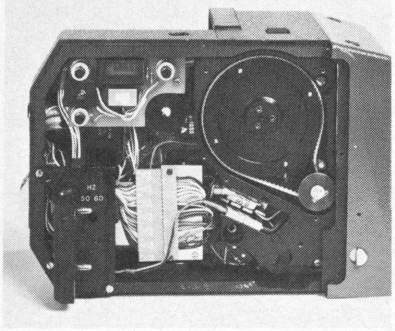

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Viewfinder (standard): Positive lock, 12x magnification. Provides greater than full-field viewing through fiber optics viewing screen. (Orientable viewfinder system *optional.*)

SPECIFICATIONS

Film Capacity: Quick-change, cassette-type coaxial magazines designed to accept:
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Rotating Mirror Shutter: Single-blade full-speed belt driven mirror shutter set at 45° angle; stops automatically in viewing position.

Dimensions:
GSMO camera with 30m (100′) magazine: 12.9cm wide x 11.8cm high x 19.3cm long (5.06″ x 4.63″ x 7.61″)
GSMO camera with 60m (200′) magazine: 12.9cm wide x 14.2cm high x 24.3cm long (5.06″ x 5.60″ x 9.56″)
GSMO camera with 120m (400′) magazine: 12.9cm wide x 18.3cm high x 30.8cm long (5.06″ x 7.18″ x 12.12″)

Lens Mount: CP bayonet mount, with a positive locking ring. Accepts any reflex type lens that fits on any of the existing Arriflex and Eclair camera (with proper CP mount adapter).

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went through six or seven steps before it appeared on the screen. It was originally 65mm photography, but then it went through various CRI and inter-positive stages. We photographed the inter-positive on the pellicle distortion rig to remove the little guy in the middle who was originally walking around with a light bar. Then it came off the pellicle in 8-perf (VistaVision). A rotoscope element and some mattes were added and all this was combined onto 5243 stock. Then that combination was made into another inter-positive in 8-perf, which was what was finally reduced to produce the 5243s that they used to print the picture.

COMMENT: I'm amazed that it could go through as many formats and generations as that and still look as good as it does.

DYKSTRA: Eventually, and inevitably, it has to take on a kind of "dupey" look after all of that, but some of these compromises could have been avoided if we had been on the picture from the very start. If there is anything to be said about doing an effects picture, it's that it is worth the money you have to spend to involve your technicians right from the beginning, in order to make sure that your effects (which generally hinge on some very important story points) are properly integrated into the bloody movie. They ended up with Bob Wise, so they weren't lacking in foresight, but the thing that is really irritating about it is that we wound up on STAR TREK in the position of having to take scenes that had already been photographed and come up with a way to make them work—after the fact. If we had been able to select the format initially—or define some particulars in regard to the original photography to give it a different look—we could have achieved a much better product. It's the difference between a sculptor picking his own clay or having someone hand him a piece of clay and say, "Okay, sculpt something out of this." But I think this movie, despite that problem, came out very well.

QUESTION: Being that Bob Wise was up to his ears in a sea of details, did you actually have much opportunity to work with him closely?

DYKSTRA: Oh, yes. Bob was very much involved in it all the way to the end. We worked together on everything—the development of V'ger, the visualization of the Energy Probe at the end of the sequence—everything. He was there for all of that. He was spread pretty thin towards the end, what with scoring, dubbing and everything all happening in the last week—but he was there.

QUESTION: How was the special effects work divided up between you and Doug Trumbull and whoever else was involved?

DYKSTRA: I don't really know. It was kind of strange. Richard Yuricich was originally brought in to help out and then Doug was brought in to help out, and what I think happened was that by the time I was finally brought in, Richard and Doug had already begun certain sequences and had solved the problems of those sequences. We ended up with the sequences that had had the least amount of work done on them in terms of solutions to problems. We were given the problems and told to solve them, which is the way I much prefer to work, because then you can find the shortcuts yourself. In certain cases, sequences were set up in such a way that we provided one element and they provided another, which, frankly, I didn't agree with at the time, but I think it worked out fine.

QUESTION: Backtracking to that opening sequence, can you give me a sort of step-by-step description of what was involved?

DYKSTRA: The elements for the opening were the following: the cloud that appears in the background (which is the alien enemy), then the Klingons, who are in the three ships which are the major subjects of the scene. Doug and I worked on this sequence with the attitude: "We've got to give the people a really exciting visual experience here—as exciting as we can within the context of telling the story." So we just set about doing it, but the choreography of that opening sequence was based on a cloud which was not completed until two weeks before the end of production. So there were Klingon warships moving around in space with no cloud to go with them. We got a model of the Klingon ship and looked at it to see what we could do with the bloody thing. We figured out some moves and storyboarded them and went over them with Bob Wise to see if he would go for them or not. We had to go over them with Doug, as well, because Doug, at that time, had the intention of generating the cloud in a way that was different from how it was finally generated. We provided moves that were very slow and deliberate, because Bob wanted to preserve a mass look in terms of the ships. Because of the way the cloud was to be generated, you couldn't move the ships very radically, the reason being that you couldn't duplicate that kind of move on the background. So it was shot using a conventional system—blue screen with one model. The cloud was shot with stars, which made it a composite element when it went into the optical printer to be put together with the other elements. All of the ships were separations. Some of them were run with cover mattes, and some without, depending upon how many passes there were. It was kind of tough getting the stars to hold up in some of them.

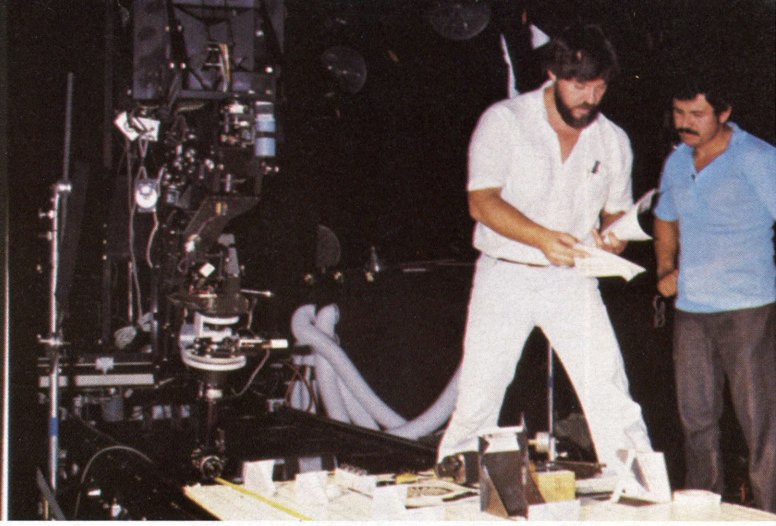
QUESTION: From what you said, I gather that the model of the Klingon ship had been created before you got there and that it required some modification on your part. Was that the case?

DYKSTRA: Yes. That model, when it came to us, had been set up for some other photographic technique that didn't fit with ours. So we had to go in and completely redo the lighting. That was done by Grant McCune and the people he had working with him, which is basically a very similar staff to the ones we had on STAR WARS and other shows. They did an incredible job. They took all the teeny little lights out of the model and put in some lights of significant size—and they did it in a matter of a few days. They really did a nice job of redoing the model, without destroying what was already there. They had to add a lot of detail to it because we got much closer to the model than I think they ever intended to before. Once the thing with the ship was worked out, Doug Smith, in charge of shooting that sequence, photographed the opening shot. We had to shoot double-pass mattes on that, rather than shooting it against a blue screen and it was sort of fun mixing the techniques together.

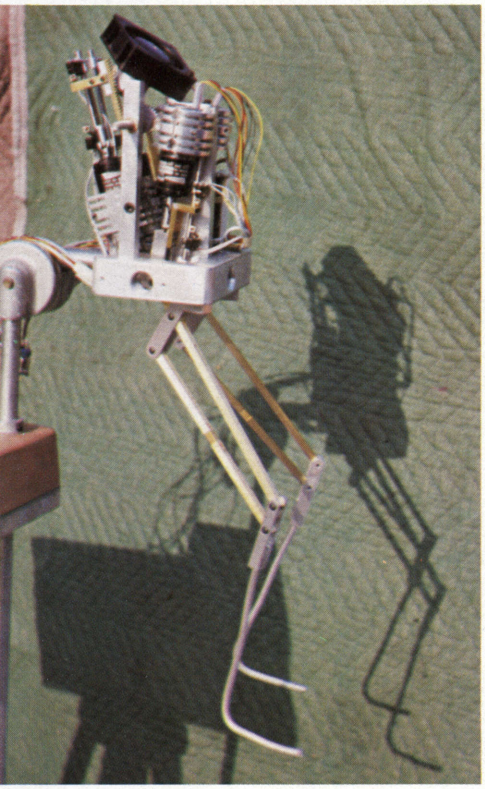
QUESTION: What did you finally do about the cloud?

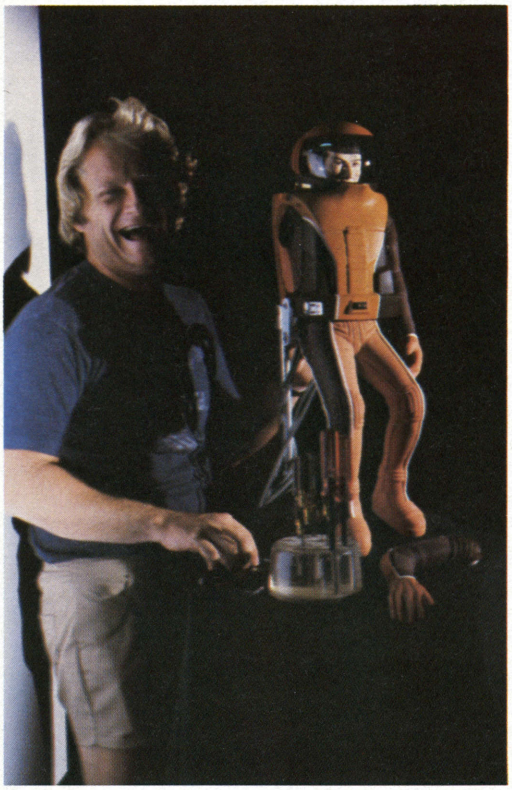
DYKSTRA: Mike Lawler was in charge of shooting the cloud for that sequence, after they decided that the system they had originally conceived for generating the cloud was too complex. It started getting down to the point where it really wasn't worth the losses that we'd have to take elsewhere to go ahead and complete the implementation of the cloud as it was originally conceived. So we took multi-level flat artwork and photographed it and the end result was fine for that sequence.

Continued on Page 193



(LEFT) Prepping the V'ger model for one of seven photographic passes in order to achieve the final in-camera composite. (RIGHT) The camera rig used to photograph V'ger during depth of field tests. A great deal of light was needed in photography so that the lens could be stopped down to T/22 in order to achieve maximum depth of field.





(FAR LEFT) The armature and mechanics needed to activate a miniature spaceman. (LEFT) The completed miniature spaceman with one of its creator's.

(RIGHT) Sculpting a rough form for "Ilia's" electrical discharge pass. (FAR RIGHT) Ilia's form covered with electrical discharge, to be combined with original photography.

UNIVERSE AND BEYOND
Continued from Page 137

Wise's distinguished career.

Gene Roddenberry began his writing career while stationed in the South Pacific with the Army Air Corps, where as a flyer he participated in 89 missions and sorties. His first scripts were for such television shows as *"Goodyear Theatre," "The Kaiser Aluminum Hour," "Four Star Theatre," "Dragnet," "The Jane Wyman Theatre"* and *"Naked City."* For two years, he served as head writer for *"Have Gun, Will Travel."* His episode, *"Helen of Abiginian,"* the series' first after the pilot, won the Writers Guild Award and was distributed to writers as a model.

Next Roddenberry created and produced *"THE LIEUTENANT,"* the TV series about the Marines with Gary Lockwood and Robert Vaughn starred. *"Star Trek"* followed. Reaching outside television, it won science fiction's coveted Hugo Award, and became the only series ever to have an episode preserved in the Smithsonian Institution in Washington, D.C. In addition, the original *U.S.S. Enterprise* from the series inspired the naming of NASA's space shuttle, and today *"Star Trek's"* original 11-foot starship model is on display in the Smithsonian.

The screenplay for STAR TREK—
Continued on Page 202

TECHNICAL CREDITS FOR "STAR TREK—THE MOTION PICTURE"

Directed by ..... ROBERT WISE
Produced by ..... GENE RODDENBERRY
Screenplay by ..... HAROLD LIVINGSTON
Story by ..... ALAN DEAN FOSTER
Based on "Star Trek" Created by ..... GENE RODDENBERRY
Director of Photography ..... RICHARD H. KLINE, A.S.C.
Production Designer ..... HAROLD MICHELSON
Edited by ..... TODD RAMSAY
Music by ..... JERRY GOLDSMITH
Special Photographic Effects Directed by ..... DOUGLAS TRUMBULL
Special Photographic Effects Supervisor ..... JOHN DYKSTRA
Special Photographic Effects Produced by ..... RICHARD YURICICH
Executive in Charge of Production ..... LINDSLEY PARSONS, JR.
Associate Producer ..... JON POVILL
Special Animation Effects ..... ROBERT SWARTHE
Special Science Advisor ..... JESCO VON PUTTKAMER
Special Science Consultant ..... ISAAC ASIMOV
Costume Designer ..... BOB FLETCHER
Set Decorator ..... LINDA DeSCENNA
Make-Up Artists ..... FRED PHILLIPS, JANNA PHILLIPS, VE NEILL
Hair Stylist ..... BARBARA MINSTER
Sound Mixer ..... TOM OVERTON
Music Editor ..... KEN HALL
Unit Production Manager ..... PHIL RAWLINS
Assistant Director ..... DANNY McCAULEY
Second Assistant Director ..... DOUG WISE
Art Directors ..... JOE JENNINGS, LEON HARRIS, JOHN VALLONE
Prop Master ..... DICK RUBIN
Script Supervisor ..... BONNIE PRENDERGAST
Assistant Film Editors ..... RICK MITCHELL, RANDY D. THORNTON
Supervising Sound Editor ..... RICHARD L. ANDERSON
Sound Editors ..... STEPHEN HUNTER FLICK, CECELIA HALL, ALAN MURRAY, COLIN WADDY, GEORGE WATTERS II
Sound Effects Created by ..... DIRK DALTON, JOEL GOLDSMITH, ALAN S. HOWARTH, FRANCISCO LUPICA, FRANK SERAFINE
Dialogue Editor ..... SEAN HANLEY
Supervising Re-Recording Mixer ..... BILL VARNEY
Re-Recording Mixers ..... STEVE MASLOW, GREGG LANDAKER
Construction Coordinator ..... GENE KELLEY
Mechanical Special Effects ..... ALEX WELDON, DARRELL PRITCHETT, RAY MATTEY, MARTY BRESIN
Graphics ..... LEE COLE
Production Illustrators ..... MAURICE ZUBERANO, MICHAEL MINOR
Publicity ..... JOHN ROTHWELL, SUZANNE GORDON
Still Photographer ..... MEL TRAXEL
DGA Trainee ..... KEVIN CREMIN
Accountant ..... CHARLES A. OGLE
Secretary ..... ANITA TERRIAN
Camera Operator ..... AL BETTCHER
Assistant Cameramen ..... MICHAEL GENNE, ROB WISE
Gaffer ..... LARRY HOWARD
Key Grip ..... BOB SORBEL
Wardrobe ..... AGNES HENRY, JACK BEAR
Special Assistant to Mr. Roddenberry ..... SUSAN SACKETT
Special Photographic Effects ..... DAVE STEWART
Director of Photography ..... RICHARD YURICICH
Matte Paintings ..... MATTHEW YURICICH
Additional Matte Paintings ..... ROCCO GIOFFRE
Miniatures ..... GREG JEIN, RUSS SIMPSON, JIM DOW
Special Photographic Effects ..... DON BAKER
Cameramen ..... PHIL BARBERIO, DON COX, DOUGLAS EBY, JOHN ELLIS, DAVID HARDBERGER, ALAN HARDING, DON JAREL, LIN LAW, CLAY MARSH, DAVID McCUE, MAX MORGAN, SCOTT SQUIRES, HOYT YEATMAN
Additional Photography ..... JIM DICKSON, BRUCE LOGAN
Special Photographic Effects Editorial ..... JACK HINKLE, VICKI WITT
Special Electronic and Mechanical Design ..... EVANS WETMORE, RICHARD HOLLANDER
Production Illustrators ..... DAVID NEGRON, ANDY PROBERT, TOM CRANHAM, ROBERT McCALL, DON MOORE
Special Mechanical Design ..... GEORGE POLKINGHORNE
Special Visual Consultants ..... VIRGIL MIRANO, GUY MARSDEN
Special Photographic Effects Gaffer ..... DAVID GOLD
Special Photographic Grip ..... PAT VAN AUKEN
Special Effects Props and Miniatures ..... LARRY ALBRIGHT, BRUCE BISHOP, AL BROUSSARD, CHRIS CRUMP, LEE ETTLEMAN, MIKE FINK, KRIS GREGG, RICK GUTTIEREZ, MIKE McMILLEN, TOM PAHK, CHRIS ROSS, ROBERT SHORT, ROBERT SPURLOCK, MARK STETSON, RICK THOMPSON, PAUL TURNER, DON WHEELER
Special Photographic Effects Photography ..... THANE BERTI, GLENN CAMPBELL, CHRISTOPHER GEORGE, SCOTT FARRAR, ROBERT FRIEDSTAND, ROBERT HOLLISTER, RUSS McELHATTON, MIKE PEED, LEX RAWLINS, JONATHAN SEAY, STEVE SLOCUM, BOB THOMAS
Animation and Graphics ..... DEENA BURKETT, ALISON YERXA, LISZE BECHTOLD, MERLLYN CHING, ELRENE COWAN, CY DIDJURGIS, LESLIE EKKER, LINDA HARRIS, NICOLA KAFTAN, JOHN KIMBALL, THOMAS KOESTER, DEIDRE LE BLANC, LINDA MOREAU, CONNIE MORGAN, PAUL OLSEN, GREG WILZBACH
Special Electronics ..... KRIS DEAN, STEPHEN FOG, JOHN GILMAN, JIM GOODNIGHT, FRED IGUCHI, ROBIN LEYDEN, GREG McMURRAY, MIKE MYERS, JOSH MORTON
Special Editorial ..... MICHAEL BACKAUSKAS, KATHY CAMPBELL, NORA JEANNE SMITH
Special Photographic Effects Projectionist ..... JOHN PINER
Special Photographic Effects Project Managers ..... JOHN JAMES, BILL MILLAR
Assistant to Mr. Trumbull ..... MONA THAL BENEFIEL
Assistant to Mr. Yuricich ..... JOYCE GOLDBERG
Special Assistant to Photographic Effects ..... LEORA GLASS, BRETT WEBSTER
Special Optical Consultants ..... ALAN GUNDELFINGER, MILT LAIKEN
Special Mechanical Designs ..... GEORGE RANDLE CO., PRECISION MACHINE, DIETER SEIFERT, ROURKE ENGINEERING
Transportation Coordinator ..... ROBERT MAYNE
Special Photographic Effects Sequences by ..... APOGEE, INC.
Special Photographic Effects Supervised by ..... JOHN DYKSTRA
Special Photographic Effects Project Manager ..... ROBERT SHEPHERD
Miniatures Supervised by ..... GRANT McCUNE
Director of Optical Photography ..... ROGER DORNEY
Special Photographic Effects Cameramen ..... CHUCK BARBEE, BRUNO GEORGE, MICHAEL LAWLER, JERRY POOLER, DOUG SMITH, JOHN SULLIVAN

Special Animation Effects ..... HARRY MOREAU
Special Electronic Design ..... ALVAH J. MILLER, MAT BECK, PAUL JOHNSON, STEVE SASS
Production Illustrators ..... MARTIN KLINE, SYD MEADE, JACK JOHNSON, JOHN SHOURT
Special Mechanical Design ..... DICK ALEXANDER, BILL SHOURT, DON TRUMBULL
Special Photographic Effects Photography ..... COSMOS BOLGER, DENNIS DORNEY, ROBERT ELSWITT, PHIL GONZALES, GREG KIMBLE, RON NATHAN, MICHAEL SWEENEY, DIANE E. WOOTEN
Special Effects Props and Miniatures ..... DAVID BEASLEY, JOHN ERLAND, JOE GARLINGTON, PETE GERARD, RICK GILLIGAN, RICHIE HELMER, MICHAEL JOYCE, DEBORAH KENDALL, DON KURTZ, PAT McCLUNG, GARY RHODABACK, JOHN RAMSAY, DENNIS SCHULTZ, DAVID SCOTT, DICK SINGLETON, RICHARD SMILEY, DAVID SOSALLA, SUSAN TURNER, DON WEBBER, GARY WEEKS

Special Photographic Effects Grips ..... MARK CANE, MARK KLINE
Special Photographic Effects Gaffer ..... CHUCK EMBREY
Wardrobe ..... MARY ETTA LANG
Animation and Graphics ..... ANGELA DIAMOS, JOHN MILLERBURG
Special Photographic Effects Editorial ..... DENNY KELLEY, DAVID BARTHOLOMEW, STEVE KLEIN, STEVE MARK
Special Visual Consultants ..... MIKE MIDDLETON, ERIK NASH, PHIL JOANOU
Assistant to Mr. Dykstra ..... MIMI McKINNEY
Assistant to Mr. Shepherd ..... ANN. M. JOHNSTON
Special Assistance to Photographic Effects ..... DEBORAH BAXTER, JANET DYKSTRA, PHILIP GOLDEN, PROCTOR JONES, TUT SHURTLEFF
Special Optical & Mechanical Consultants ..... B/G ENGINEERING, ABBOT GRAFTON, GERALD NASH
Geometric Designs ..... RON RESCH, BOSTON UNIVERSITY
Certain Models Manufactured at ..... MAGICAM, INC.
Titles ..... RICHARD FOY/COMMUNICATION ARTS, INC.
Orchestrations by ..... ARTHUR MORTON
Scoring Mixer ..... JOHN NEAL

Theme from "Star Trek" Television Series by GENE RODDENBERRY and ALEXANDER COURAGE.

Grateful acknowledgement is made to the National Aeronautics and Space Administration.

"Star Trek" is the trademark of Paramount Pictures Corporation and is registered by the United States Patent and Trademark Office.

Computer Motion Control System for Miniatures—BO GEHRING.

Certain Special Visual Effects Conceived and Designed by ROBERT ABEL & ASSOCIATES, INC.

RA & A Designs by ..... RICHARD TAYLOR

Medical Computer Displays Courtesy of DIGITAL EQUIPMENT CORPORATION

Production Kinetic Lighting Effects in Engine Room and V'ger 6 Complex by SAM NICHOLSON & BRIAN LONGBOTHAM

Technical Assistance by POLAROID CORPORATION.

Certain Computer Equipment by SUTHERLAND COMPUTER CORPORATION

Casting ..... MARVIN PAIGE

"Star Trek—The Motion Picture" Books Published by POCKETBOOKS.

Lenses and Panaflex Camera by PANAVISION®

Color by METROCOLOR® Recorded in DOLBY STEREO

CHICAGO FILM FESTIVAL CELEBRATES 15th YEAR

The 15th Anniversary of this famed film festival is highlighted by lively attendance, the presence of delegates from 15 countries, six tributes to distinguished filmmakers and a varied program of films

Delegates from 15 countries came to Chicago for the 15th anniversary of the Chicago International Film Festival, November 2-21, 1979. The high quality of Festival films was widely praised, and critics are now saying that Chicago's Film Festival is one of the best in the United States.

It is the Festival for serious filmgoers . . . . those who want to see the newest in international filmmaking, those who want to be in on the beginning of a film career, and those who want to meet and talk with internationally prominent directors, actors, critics and writers who come to Chicago for the openings of their films.

FESTIVAL SCOREBOARD

110 film events in four theatres
6 tributes: George Cukor, Colleen Moore, Karen Black, Peter Ellenshaw, Maximilian Schell, and Soviet Cinema's 60th anniversary
Two weeks of Senior Citizen screenings
A pilot program of seminars on film finance launched
40 countries represented
27 sold-out houses
10 categories of competition

BIG PLANS FOR 1980

Festival founder and Director, Michael J. Kutza, Jr. announced plans for next year, including a major conference on film funding and film technique; an animation series; expanded senior citizen screenings; and a documentary section in the 1980 Festival. Mr. Kutza said, "Along with the rise in quality of international film product, we are experiencing a growth of new talent here in the United States, with independent filmmakers turning out an exciting variety of new productions. Documentary features are coming into their own, and general audiences are flocking to them. This year more students, critics, educators and filmmakers than ever came to Chicago for the Festival. Internationally, the Chicago Festival is the most respected in the U.S., and the numbers of foreign critics at the Festival proves it."

COMING ATTRACTIONS FOR 1980

Cinema/Chicago, the Festival's year-round, not-for-profit parent organization, will present:

A Hispanic-American Film Week (April); The Dance Film Festival (June); Free Films in the Park (July-August); INTERCOM/Industrial-Informational Film Competition (September).

HUNGARY WINS TOP AWARD

The Hungarian feature film production ANGI, VERA won the coveted Gold Hugo award for Best Picture of the 15th annual Chicago International Film Festival. Director Pal Gabor's film won for giving an eloquent voice to human values. A Silver Hugo was awarded to Victor Nunez's U.S.A. production GAL YOUNG UN and a Bronze Hugo went to the West German IN A YEAR OF 13 MOONS, directed by Rainer Werner Fassbinder. Gold Plaques were given to ALBERT WHY? from West Germany (Josef Rodl, director) and THE DEPUTY from Spain (Eloy de la Iglesia, director).

Acting honors went to three performers. Poland's Jerzy Stuhr won a Best Actor Golden Plaque for his performance in TOP DOG. Julie Vincent in the Canadian presentation SCREAM FROM SILENCE and Veronika Papp in ANGI, VERA tied for Best Actress. Each will receive a Golden Plaque for her performance.

A Best Screenplay Golden Plaque was given to Carlos Saura's MAMA TURNS 100 and a Best Mise-en-scene Golden Plaque was awarded to Michel Andrieu's French BASTIEN, BASTIENNE.

WINNERS IN OTHER CATEGORIES

Golden Hugo winners in other categories were: CHAIRMEN, National Film Board of Canada, for Animation; SONG OF THE CANARY, New Day Films and BEST BOY, Only Child Motion Pictures, Inc., Documentaries; MASTER CRIME, Learning Corporation of America, Short Subject; MISSION: MIND CONTROL, ABC News Closeup, Network Television Productions; BLEACHER BUMS, WTTW/Chicago Public TV, Local Television Productions; THE HUNDRED PENNY BOX, Churchill Films, Educational Film; VISITORS, Doyle Dane Bernbach, Television Commercials, and ON THE BOULEVARD, Optic Nerve Films, Independent Video.

A Gold Hugo in the Student Film category went to Carroll Parrott Blue for VARNETTE'S WORLD: A STUDY OF A YOUNG ARTIST.

This year's Festival was dedicated to director George Cukor, responsible for such classics as THE PHILADELPHIA STORY, A STAR IS BORN (1956) and MY FAIR LADY. Mr. Cukor visited the Festival for a salute to his unique talents and received a Gold Hugo for creating a lifetime of films of enduring quality and entertainment. ■

(LEFT) The marquee of the Chicago Theatre (3,500 seats) is prepared for the opening Night program of the 15th Chicago International Film Festival, the United States premiere of CHRIST STOPPED AT EBOLI (Italy), directed by Francesco Rosi. The Chicago was one of four theatres presenting the 110 film events of the festival. (RIGHT) Suzanne McCormick, Executive Director of the Chicago International Film Festival, chats with Michael J. Kutza, Jr., Director. This year's festival was dedicated to the legendary Hollywood director, George Cukor.

MAGICAM MINIATURES
Continued from Page 155

long by four-foot-wide model, considering that some STAR WARS models weighed three hundred pounds and were only four feet long. A design job from beginning to end, the *Enterprise* will be ready for any number of sequels should the production company decide to do so.

Larry Albright and Paul Turner designed the lighting systems for the ship; Larry, the high voltage neon and Paul, the incandescent. Neon was chosen because of the impracticality of the use of fiber optics, due to the armaturing system (five-way) and its ability to throw a great deal of light without the attendant heat, as with incandescents. It was used wherever there was a light source in an inaccessible area and for longevity. The tiny point sources of incandescents were used where needed.

Meanwhile, design sketches for the other models began to arrive, were costed out and put into production. Start-up procedures followed—armature, molds, skins, lighting, final detailing and paint. Expediting things, we agreed to carrying the models to about 80 to 90 percent completion and turning them over to the Seward facility for final paint tweaking and on-camera testing.

The Drydock is quite worthy of note. We had already built the model once, broken it down, and packed it away. We were painfully aware of the problems involved in building the miniature of a 1200-foot-long spider web structure designed to be built in the nongravitational vacuum of space. Our problem was to construct the structure in the gravitational and atmospheric reality of our earthly environ, and this delicate structure had to withstand the rigors of stage shooting.

A design arrived from Abel production designers based on the Gene Roddenberry idea of a flat-topped table structure which would envelope and mother the *Enterprise*. The design consisted of hundreds of thousands of pieces which would have to be injection molded and strung on thin wires to form trusses. It would have been labor intensive and, therefore, extremely expensive to do it this way. I budgeted the structure as designed and slapped a price tag on it. The production people practically had a massive coronary. They screamed that I would have to cut it in half—and I told them that I could design it utilizing more realistic construction methods that would produce a model which could withstand the parameters and give the look desired. I devised the tubular truss structure, and it was given to an Abel draftsman to draw up.

The budget cut in half and all satisfied that the new Drydock design was indeed acceptable, we began initial production of what we call the "kit". Basically, over the ensuing three months, we were to produce the more than one hundred thousand modular pieces that would become the structure of the Drydock.

Lighting systems which were made of four-millimeter neon tubing and developed by Larry Albright (56 of them, requiring 3000 volts to illuminate each) originally were to be the major illumination source of the starship. The idea was for the combined models to provide their own illumination, the thought being that the lighting would be supplied totally from within the model. Hundreds of incandescents would be used in the structure, these being tiny sources called axial lamps, ten times smaller than a grain of wheat bulb. I am certain that the illumination sources discovered by our electrical people, Albright and Turner, were definitely a breakthrough for our industry. Five and six-volt computer lamps with long life ratings, good quality control for the shape of the glass envelope, and pin-based for replacement, were also

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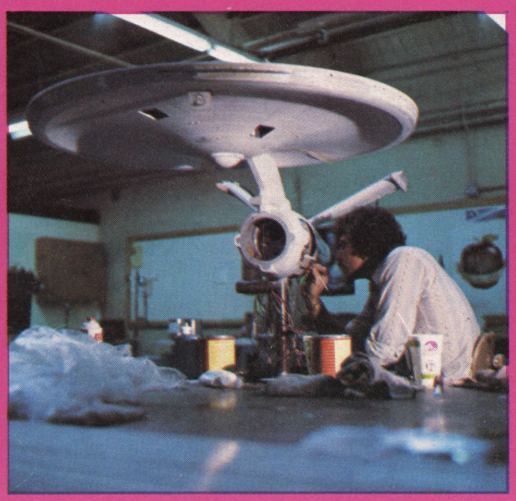
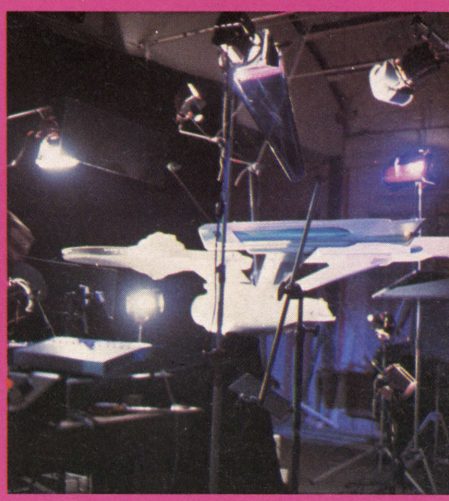
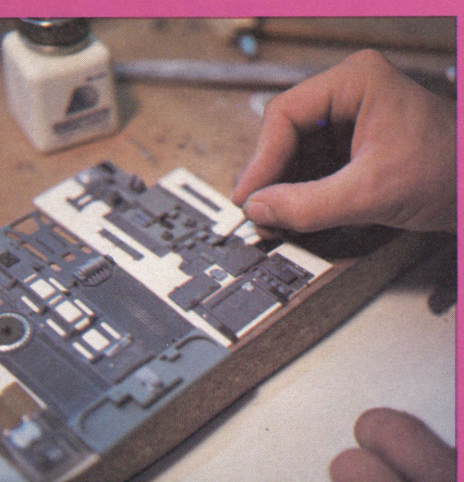
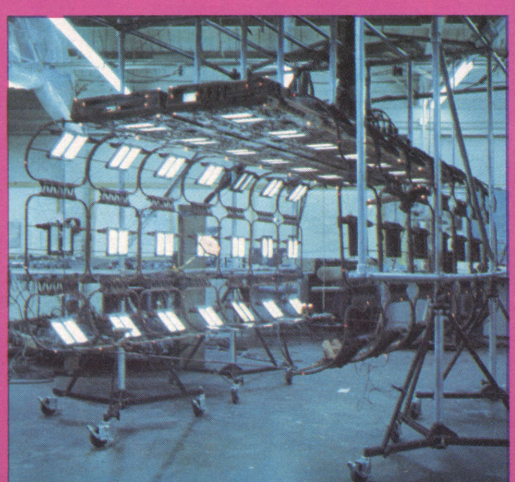
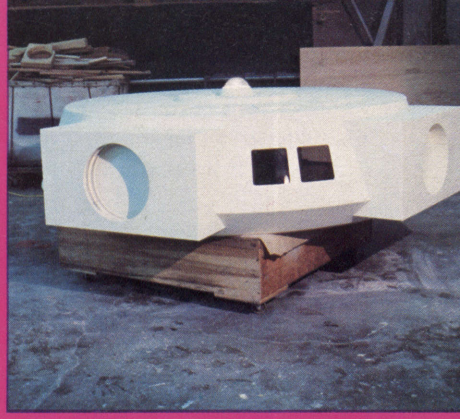




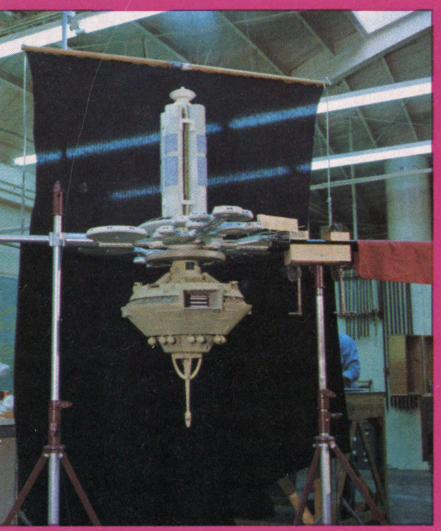
(LEFT) Chris Crump studies the aluminum elements of the 8-foot U.S.S. *Enterprise* armature, jigged up and ready for heliarcing. (CENTER) Richard Thompson detailing the main body section of the Enterprise. (RIGHT) *Enterprise* lighting test at Magicam, just prior to delivery for photography. (BELOW LEFT) Patterns for the molded modules to make up the detail in Drydock model ceiling piece. (CENTER) The Drydock model (scale: 1″ = 10′) A spiderweb of 1/2-inch brass tubing and .030 wire guys. Ten feet by six feet by four feet and covered with thousands of plastic details, it weighed 350 pounds. (RIGHT) Chris Ross works on detailing of Drydock model.

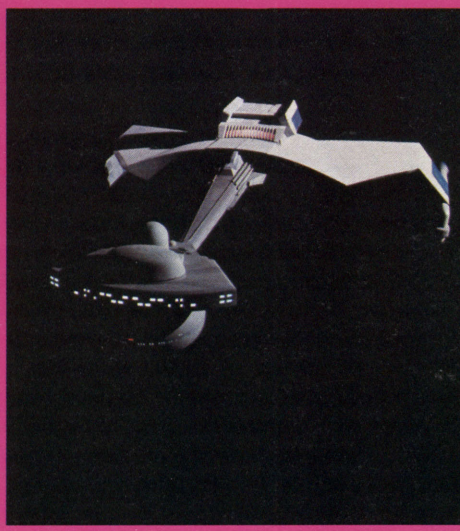




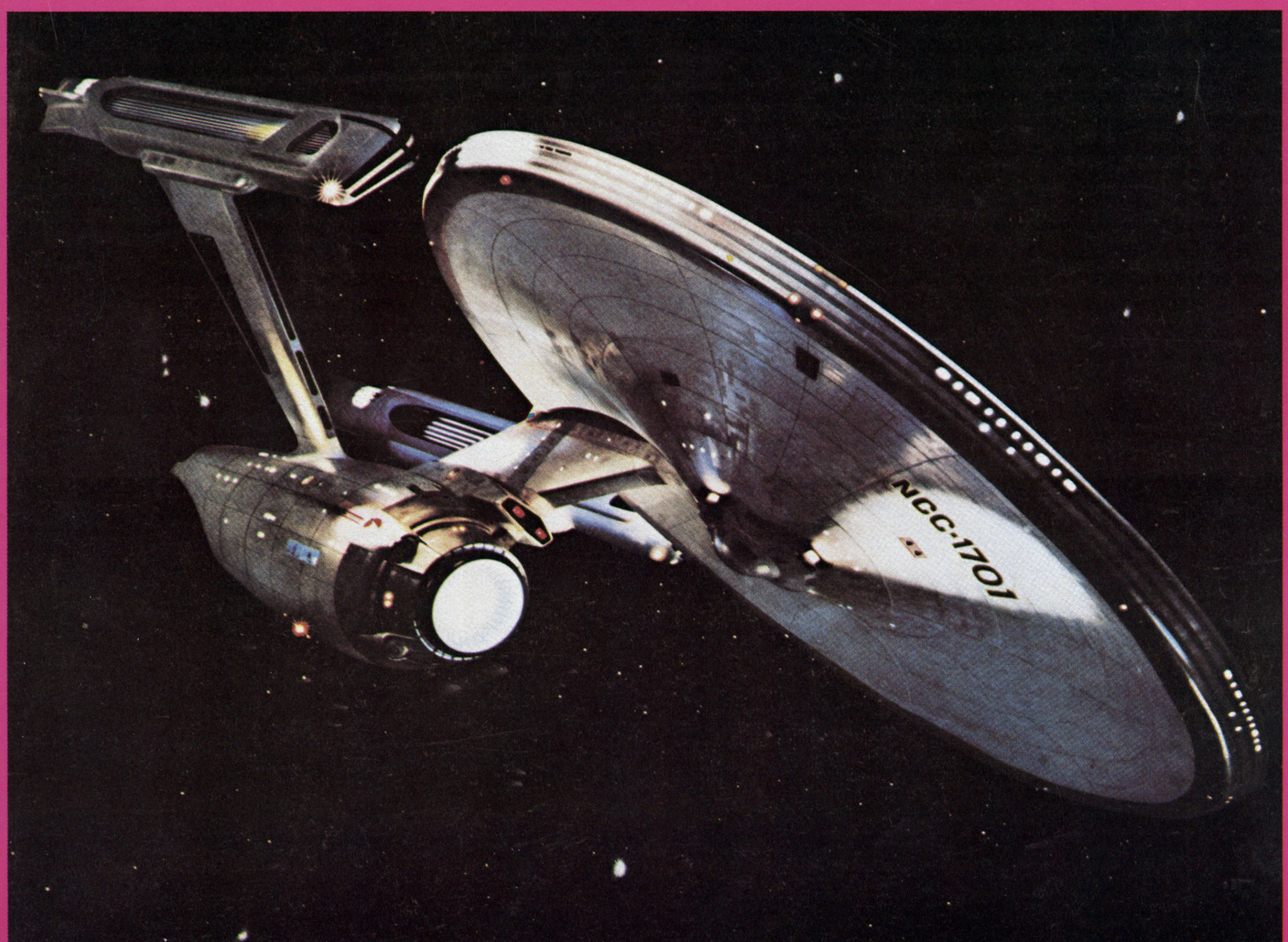


(LEFT) Some of the nearly 100,000 parts produced by the Magicam staff to make up the "kit" with which to build the Drydock model. (CENTER) The Vulcan shuttle model and its creator, Tom Park. (RIGHT) Space Office Pod enlargement model used for detail photography in docking sequence (scale: 2″ = 1′). (BELOW LEFT) Space Office Complex model (scale: 1″ = 10′). The physical size is six feet by six feet. (CENTER) Tom Park works on the cargo module for the Work Bee craft. (RIGHT) The Klingon battle cruiser, a 48-inch model.





THE MAJESTIC *U.S.S. ENTERPRISE* SOARS PROUDLY THROUGH DEEP SPACE



BEHIND THE CAMERA ON "STAR TREK"
Continued from Page 134

tion. The fact that the principal command seats (for Captain Kirk and Mr. Spock) were locked in position and couldn't be shifted gave us some problems.

One of the challenges we had to cope with from the start was the fact that the Bridge was surrounded by computer readouts that were rear-projected, for the most part (although others were put in by means of blue screen). In order to make these rear-projections read on the screen, the general lighting level had to be kept very low. I was working at approximately 20 footcandles throughout the filming of the entire picture. Now, one of Robert Wise's requests—and one which I agreed with—was for a rich depth of field, which is quite difficult to achieve when you are working in the anamorphic format at very low light levels. To solve that problem, I used split-diopters on, I would say, 80 percent of the scenes—sometimes as many as three. I feel that these did an excellent job for us and we were able to slide them on and off as we panned the camera; we weren't confined to stationary shots. The main consideration was always to hide the blend line with a shadow, a hot spot or a vertical line in the set.

The style of the sets, as designed by Bob Wise and Harold Michelson, was to be very sterile and we were always careful to have everything spotless. It had a pristine look to it. So the visual style added up to a combination of this sterile look, very soft (not harsh) colors and great depth of field achieved through the use of split-diopters (of which Panavision's are, without a doubt, the best). The availability of the Panaflex camera also enabled us to get into tight corners where a conventional camera would never fit.

With all of these elements working together, I do think we have a striking-looking film. It is very stark and the characters are very bold visually. They are unique-looking. The wardrobe was very carefully designed and every detail was approved by Bob Wise. He is very thorough and probably the most "complete" director I've ever worked with. This marked the second occasion that I've worked with him (the first was THE ANDROMEDA STRAIN) and I must say that without Bob Wise I don't know where this picture would have been. I don't know how we would have achieved what we did. His thorough knowledge of every aspect of production and his unrelenting determination to get what he wanted onto film were always in evidence. He would not give up on anything. He would try, try, try something else.

The major illumination in the sets was basically a lot of bounce light, but in order to avoid the monotonous look of flat, soft light, I used it in a contrasty manner—soft light, but projected from side angles. I also used quite a bit of straight backlight. For example, I would light a wall and let an actor go semi-silhouette or full-silhouette against that wall.

Unfortunately, we were limited by a set that was not a breakaway set. Everything was practical. There were ceilings and there was really very little chance to conceal lights. In addition, with the myriad of monitors that had reflective glass in front, you couldn't hide lights where you wanted to because the glass was always picking up reflections. So I did use soft light, many times bouncing it off of cards or Foamcore. Sometimes, as I have said, it was quite contrasty; at other times I used the same kind of light, but in a very low-key way.

What I tried to do was avoid the monotony of one type of lighting. In this respect, some color values were used to add another dimension, and there is a variety of textures throughout the entire film. These helped to get away from any sameness in the use of soft light.

HMI lighting was used quite a bit in photographing this feature, and it was projected directly into the set—not bounced, as with soft light. For one specific sequence at the end of the film, in what was known as the "V'ger" set, we used practically every HMI light in Hollywood. Also incorporated into this unique set were projected lights that were designed by two very able technicians, Sam Nicholson and Brian Longbotham. All of these elements, combined with quite a few matte shots created by Doug Trumbull in post-production, resulted in an interesting effect. We all put our heads together to come up with something quite unusual.

Speaking of the HMI lights, we fortunately did not have any flicker problems (and this was before flicker meters were available), but we did have grounding problems and we almost lost an electrician through electrocution. I think there is still a bug here and there in relation to the safety factors of HMI, but the principle is superb and I love the light. I'm very cautious with the HMIs from the standpoint of safety, and I do hope that at some point in the near future, the safety factors will be improved and the cabling made less dangerous.

One of the reasons why we used the HMI lights inside was to achieve a blue cast, which we wanted, and we shot without corrective filters. However, throughout the sequence there were many color and light changes, which

The Bridge of the *Enterprise* presented several interesting photographic challenges, in that it was circular and all in one piece (with no breakaway walls). Kline took it all in stride, achieving a lush visual quality. At left can be seen the light pole which was moved around the set by a gaffer during the Energy Probe sequence to simulate the shifting source of the probe invading the ship.

were achieved by means of gels that were slipped on and off the lights during the scene. For example, two lights with shutters would often be set up side-by-side. The shutters would be synchronized so that one opened as the other closed, thus giving us desired changes in light value or color value or intensity. We switched from red to green to blue to glaring white light, and we had a marvelous relationship with the Rosco people, who provided us with many different colors of gels. Their representative, Mike Niehenke, was on the set almost every day, asking what we needed and making sure that it got there. As I said before, we were not able to do proper pre-planning, so that's why we needed the Rosco people to be at our beck and call as we went along, and they responded brilliantly. I don't have any statistics on the amount of gels that we used, but we went through roll after roll. They even had to send to the East Coast for extra supplies, because they didn't have enough here to meet our demands. The bill was enormous.

As love blossoms, Collins and Khambatta play a game of electronic chess aboard the *Enterprise.* Soft light (directional, not flat) was used generally for sequences on the starship. Prime lenses were used exclusively, except for a couple of unavoidable zoom shots and not one foot of the film was forced in development. The result: a "pristine" look.

When the astronauts penetrate the alien entity, they emerge from the *Enterprise* and walk across a pathway of stones that are suspended in air. We shot them doing this, but the scene was enhanced in post-production by means of miniature artwork. After they cross the stones they arrive at a glaring mound, which is "V'ger". They don't know what it is at this point, but it glares and has a mystic aura about it. They ascend an area, arrive on top and look down into a bowl that is the V'ger site. They descend to explore and that is the moment when various things begin to happen. There are color changes and density changes and other elements are flashing. There are some marvelous pyrotechnics, but not like those we've seen before in science-fiction films. This has a real poetry to it and there is an intrigue that completes the story and explains what has gone before. Again, this is where we used the HMI units exclusively, in combination with the projected light images by Nicholson and Longbotham.

Despite the low light level that I used in photographing most of the scenes, there was absolutely no forced-developing in the picture—not one foot of it. We used high-speed lenses and, also, the laboratory helped us out so that we were able to function without building up grain. All of our shots that were to include effects to be added later were filmed in 65mm for optimum original quality, but in using the 65mm cameras, we did not have the super-speed lenses that are available with the normal Panavision complement of sophisticated equipment. This meant that we were limited as to the lenses that we could use. We did have a couple of lenses—a 40mm and a 50mm—that were fairly fast, but even here we avoided forced development and, throughout our entire filming, utilized the printing range for achieving normal exposure.

My reason for not forcing the development is that, despite what one hears to the contrary, there is a certain degradation of the image, even at a one-stop push. My feeling is that if the entire picture is pushed, then you have nothing to compare it to and the forced development can be magnificent, but I am talking about going to another generation for post-production and that's the reason we didn't want to compound the build-up of grain.

Regarding the split-diopters that I mentioned using, I feel that the set-up Panavision has for these auxiliary elements is the only one of its kind in existence. They have a marvelous range of diopters fitted into rings that are easily slipped in and out. They also have unmounted ones that we could tape on or just hold by hand. Quite often, by just hand-holding the diopter, it could be slipped very gently as the operator looked through the lens. The Panavision set-up for diopters is magnificent and I use them on practically all my shows. I first learned about them when I did THE ANDROMEDA STRAIN with Bob Wise and we used them for about one-third of the shooting. Since then I've gained a lot of experience with split-diopters and feel very comfortable with them. We certainly used them constantly on the STAR TREK feature.

The bowl-shaped V'ger set was constructed of moulded plastic material that really was not as strong as it should have been. Consequently, we could not dolly inside it because it would not stand the excess weight. Instead we used the Chapman Titan crane exclusively, which gave us a nice floating motion, the freedom of slipping right and left and up and down again. It is a superb piece of equipment and it worked perfectly for us, enabling us to move in almost any direction we wanted.

We used prime lenses throughout the filming, except for a couple of isolatec shots where a zoom lens was necessary. But this was a picture that called for prime lenses. It has a prime lens look and fee to it.

Filters were used very selectively ir the shooting, ranging from heavy fog tc low contrast, but they weren't used exclusively. We wanted a sharp look and I think it would have been wrong to shoot the whole picture with low contrast filters. We used them in specific segments where we wanted to create a softer mood or a flarey effect and we used both fog and low contrast filters. When it comes to fog filters I prefer the Tiffens because they have a more graduated range than the other lines and one can fine-tune the degree of softness better with them.

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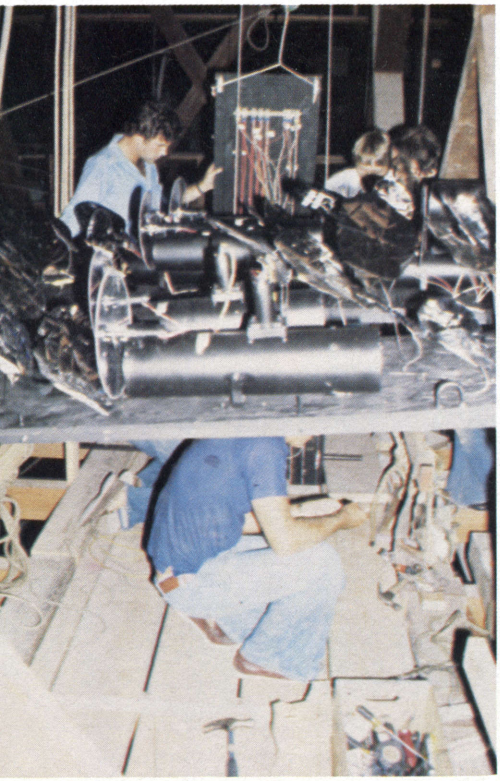
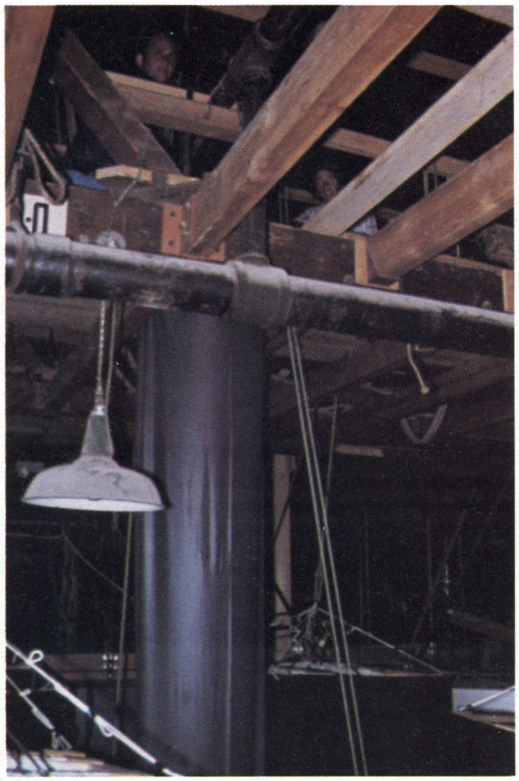
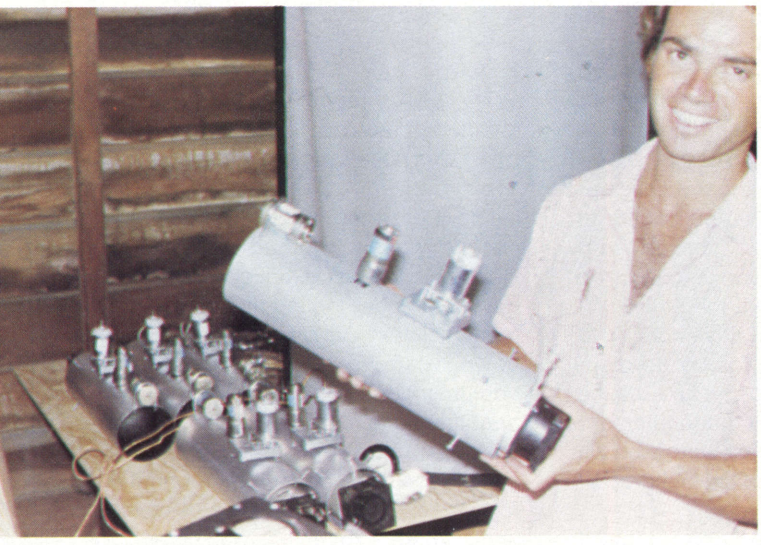
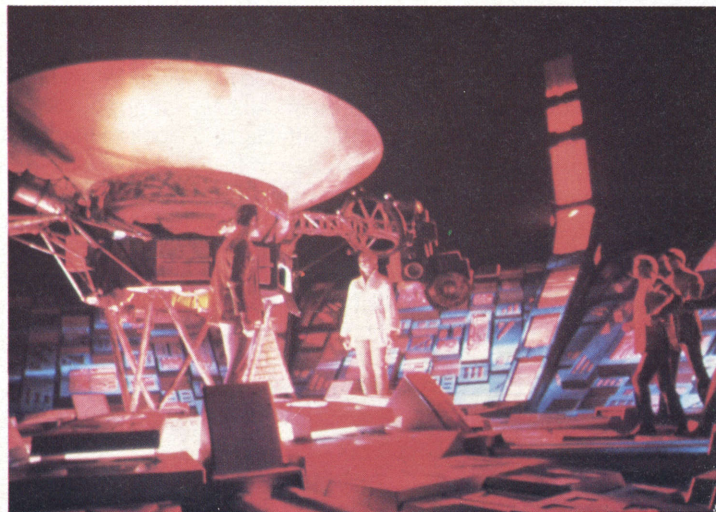




(LEFT) Sections of the kinetic lighting system used in the *Enterprise* engine are reassembled and lowered into the reactor below. (CENTER) Rear projection screen being lowered from the rafters. (RIGHT) Marty Bresin and Bob Spurlock prepare to lower Sam Nicholson (with rear projection screen) into the reactor below. The effects sought required a good deal of intricate pre-rigging.



(LEFT) Sam Nicholson shown with kinetic lights used in STAR TREK—THE MOTION PICTURE. Eventually the "light guns" were lowered into the *Enterprise*'s huge reactor. (RIGHT) With an engine prototype, Sam Nicholson and Brian Longbotham test the "reaction" in an unfinished *Enterprise* engine room. (BELOW) The fruit of the efforts of Nicholson and Longbotham: (LEFT) A scene inside the engine room of the *Enterprise* during a crisis, as the reactor begins to glow "blue hot". (RIGHT) In the heart of V'ger, flowing waves of colored light (projected from below onto the plastic floor and walls) make the set seem to be alive.



KINETIC LIGHTING FOR THE "STAR TREK" MOVIE
Continued from Page 149

placed below the set which required the entire structure be built seven feet off the ground (no small task considering the set was the size of a small football field!). To illuminate the towers we hung series of 1000-watt quartz nook lights throughout each tower's interior. These globes, totaling more than 100,000 watts, were individually sequenced when V'ger became angry. To create energy flowing from the towers, or V'ger's "circulatory system", we placed 30 1000-watt zenon arc lights below the various channels projecting kinetic waves of light onto the screens above.

To animate the circuitry diagrams we amplified a technique used to create "firelight". These were large turning drums covered with mylar, bouncing 6,000 watts of focused HMI light onto each surface between the channels. Finally, below the center of the set, we placed an additional 20,000 watts of HMI light with dowsers to illuminate a shattered tempered glass floor above.

With the system below complete, we still had the top surface to contend with. Painted various shades of silver, the set surface proved to be an excellent projection screen. We placed nine kinetic zenon lamphouses on a platform hung directly overhead. Their imagery, when bounced via front surface mirrors to the set 30' below, provided radiating waves of light to "slip the set into another dimension" at the end of the sequence.

Design and installation of the entire system was one thing; operating it was another. To tell the truth, I think Brian and I were lucky to live through it, much less operate it.

V'ger's effects system, with an output of more than 16 million source lumens, pulled over 3,000 AC amps with a simultaneous 2,000 DC amp draw. This enormous capacity definitely required Gaffer Larry Howard's technical expertise and great sense of humor to keep both tempers and circuit breakers cool during the weeks of filming.

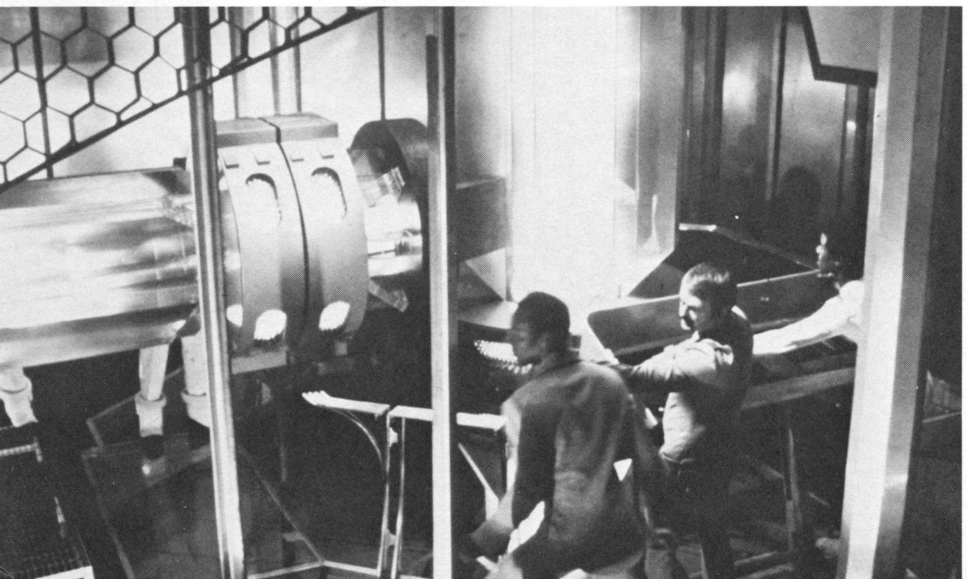
Syncing multiple effects occurring simultaneously above and below the set to the live-action was a bit like choreographing the Folies Bergere blindfolded. To change V'ger's mood, certain sequences required the entire crew (even the food service and security people) to participate in a bizarre three-ring circus of gel-changing, strobe-flashing and general confusion below the set. Yet, fortunately, everyone involved developed a great "try anything" attitude which made V'ger's brain hemisphere function dramatically during the final scenes of STAR TREK—THE MOTION PICTURE.

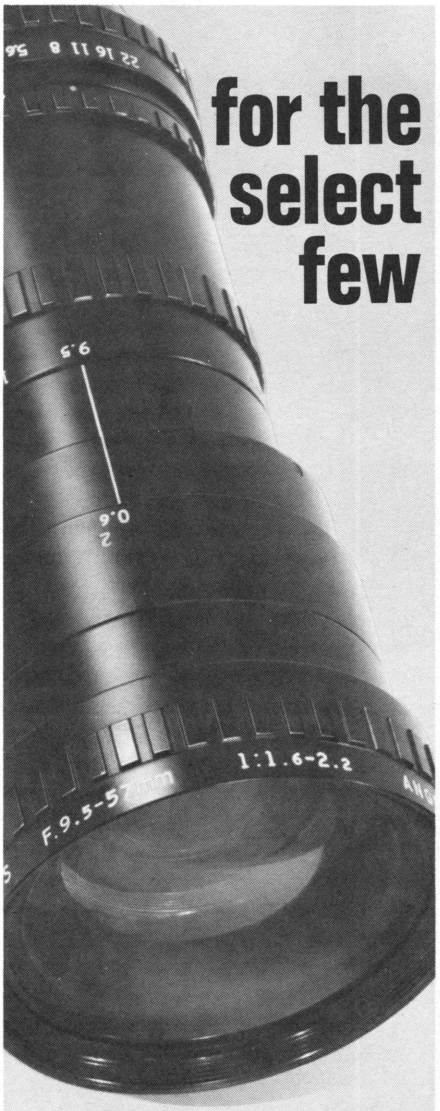
This picture was a delicate balance of many talented people working together to create the illusion of reality. To enhance the realism of this illusion, director Robert Wise encouraged our kinetic lighting efforts throughout the making of STAR TREK.

With excellent creative judgment and calm stability in directing one of the most difficult films ever made, Bob Wise served as an incredible inspiration for every member of the cast and crew and truly made STAR TREK—THE MOTION PICTURE a reality. ■

(ABOUT THE AUTHOR: Sam Nicholson and Brian Longbotham are partners in Spectrum Productions, a company producing special visual effects for film, television and commercial applications. They are currently in production on Walt Disney's new suspense thriller, A WATCHER IN THE WOODS. Recent accomplishments include design of a 24-foot rainbow for the Las Vegas Hilton Hotel, a television commercial for the American Gas Association, kinetic lighting for STAR TREK—THE MOTION PICTURE, a film version of the birth of our solar system (for NASA AMES Research Center, and magical effects for LORD OF THE RINGS. Spectrum Productions is located in Venice, California. Telephone (213) 822-3795).

The engine room of the *U.S.S. Enterprise* was where Nicholson and Longbotham were first called in to solve a special illumination problem. After that their combined expertise was utilized in the huge "V'ger" set. The young technicians, having created a 24-foot rainbow for the Las Vegas Hilton Hotel, are currently working on the Disney production, A WATCHER IN THE WOODS.





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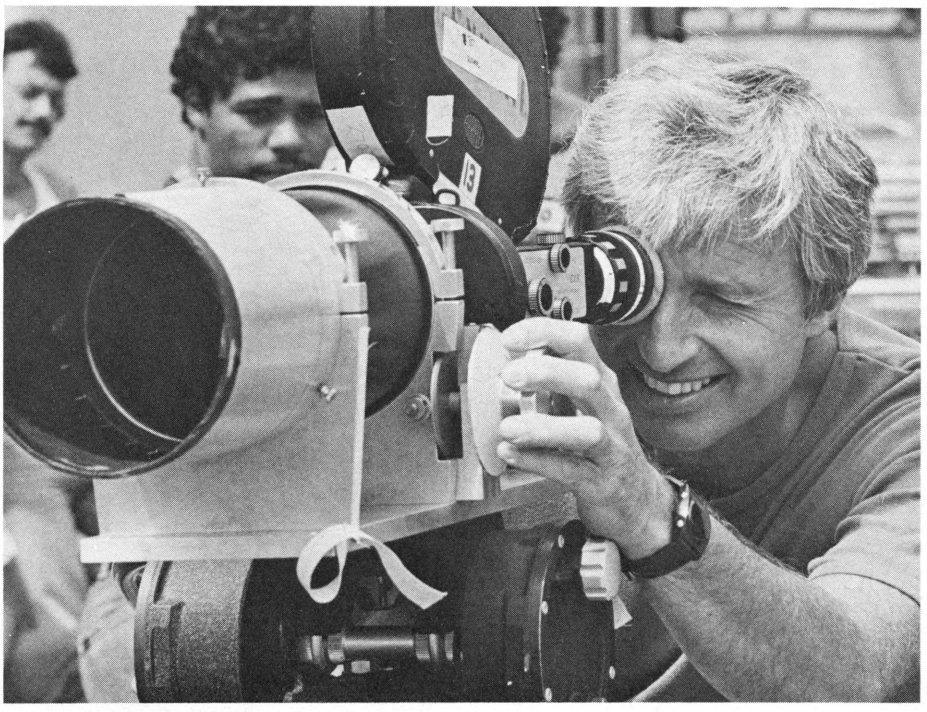

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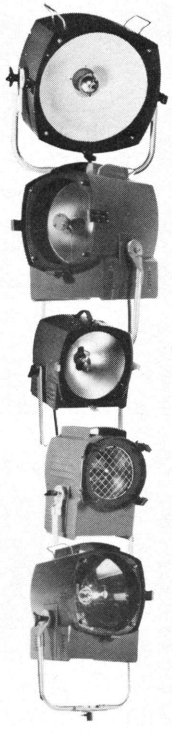

In an industry that shouts in superlatives, Victor Kemper is one of the quiet few who need no words to make their indelible mark. Kemper's work says it all. Like "Dog Day Afternoon"... "The Eyes of Laura Mars"... "Audrey Rose"... "The Last Tycoon"... "Magic"... "The Candidate"... "Justice for All"... and many more films of similar stature. To judge by the subtle power of his lighting and camera work, one would think Kemper to be at least a thirty year veteran cinematographer. The fact is that it has been only ten years since he shot his first full-length feature, titled "Husbands"; but unavoidable recognition of his extraordinary talent and sure professional skill has brought him thirty major feature films in that relatively short span. His genuine respect and consideration for the professional capabilities of others has earned Victor Kemper a lot of friends in the industry... and the highest accolade his peers can bestow: "He's one of the real ones."

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SPECIAL EQUIPMENT FOR "STAR TREK"
Continued from Page 157

have taken a different approach. Their facility is built around the smaller VistaVision cameras. VistaVision was originally brought out by Paramount in its movie WHITE CHRISTMAS in 1953 to compete with Cinemascope. Paramount commissioned Mitchell Camera Corp. to build cameras and movements for them. They were used in THE TEN COMMANDMENTS, and NORTH BY NORTHWEST, but after 1957 Panavision emerged as the leader in widescreen formats. So VistaVision went into cold storage at Paramount until John Dykstra, Richard Edland and STAR WARS came along in the late 1970s. They used converted Technicolor three-strip cameras with Vista movements. They were originally built for GONE WITH THE WIND, circa 1939. Since then Apogee has come into being and has obtained a number of Paramount VistaVision Mitchell cameras. Now many of the big studios use them: Disney in THE BLACK HOLE; Universal in BATTLESTAR GALACTICA; Lucasfilms in the new STAR WARS, and finally Paramount in STAR TREK.

There are two types of VistaVision Mitchells, one a studio camera with 2,000' coaxial magazines and a second hand-held model called the butterfly. Both are pin-registered and pull the film 8 perfs from right to left, using regular 35mm film stock. There are also high-speed models that run 100+f.p.s., but they are very scarce.

On Apogee's slit-scan installation is a studio camera set up to pivot about the lens nodal point. It has been modified by Messrs. Short and Kane at Apogee's machine shop for stop-motion and streak photography, with the addition of a follow-focus, D.C. drive and stepping motors. The assembly is mounted on a cart on tracks and is controlled by electronics designed by Al Miller. Torque motors have been added to allow running the magazines in reverse for double exposure.

The butterfly camera shown here held by Dick Alexander, Apogee's Cine Technician, is all magnesium. Paramount built the case for the Mitchell movement. A follow-focus base for it was built by the author and crew at B.G. Engineering with another base to mount it on a front screen projector.

The aperture size of VistaVision is just slightly larger than the standard 35mm still camera format. This enabled Apogee to use the excellent Nikon lenses on all their equipment, including projectors and optical printers. The only disadvantage

with the lenses is the poorly designed bayonet mount. It is spring-loaded, so the lens is subject to vibration, a deadly enemy in stop-motion photography. Apogee is modifying its Nikons for solid mounts.

The major difference between the two special effects facilities is that Maxella uses moving models and moving cameras to get its shots, while Apogee's camera booms make it possible to do a greater number of different angles while the model remains stationary. The first system of this type was built for STAR WARS and was dubbed the Dykstraflex. The two new boom camera systems at Apogee were designed by Don Trumbull and are called the Vista Flex. The Dykstraflex used a Richardson movement and could move in seven axes of rotation simultaneously. The Vista Flex can also do that and is built heavier to reduce vibrations. The camera is custom-built by the author and crew at B.G. Engineering and features a tiltable lens mount, with D.C. servo follow-focus which moves the film plane relative to the lens to maintain nodal point. It uses a custom-built Acme-style VistaVision three-register pin movement. I assembled 18 movements for Apogee's optical printers, animation stand, rear projectors and garbage matte machine.

The booms can also be adapted to other cameras. Apogee's second boom carries a Mitchell butterfly camera equipped with a Continental Camera Systems Pitching Lens. It was used for V'ger exteriors in the smoke room. It is the same lens as used by Disney Studios for its movie THE BLACK HOLE. The 12 channels of electronics designed by Al Miller control the movement of the boom along its track. It is programmed one channel at a time via a joy stick and then curve-smoothing programs are run on an Apple computer before the shot is done.

In the rush to complete STAR TREK, much of the equipment was left unanodized with sharp corners and gaffer's tape to keep it together. But all of it worked, and the movie is the proof of that. ■

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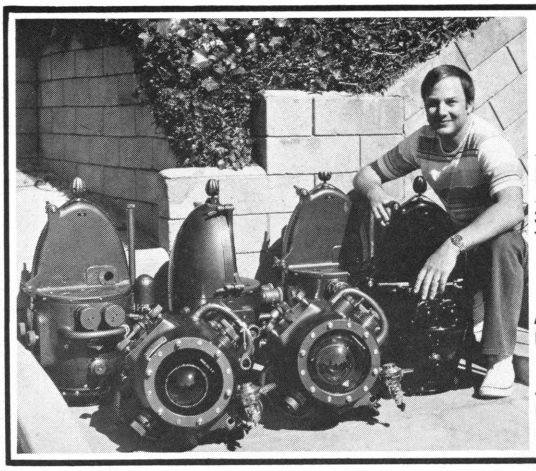

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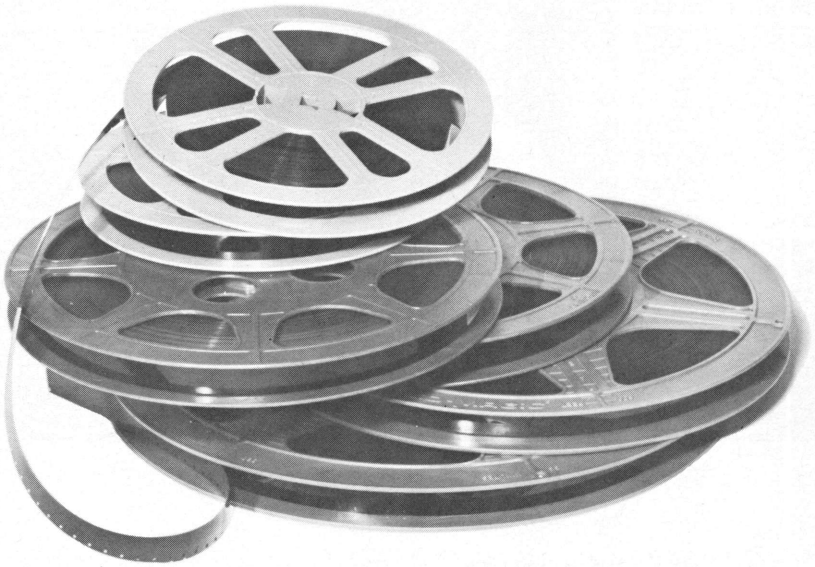

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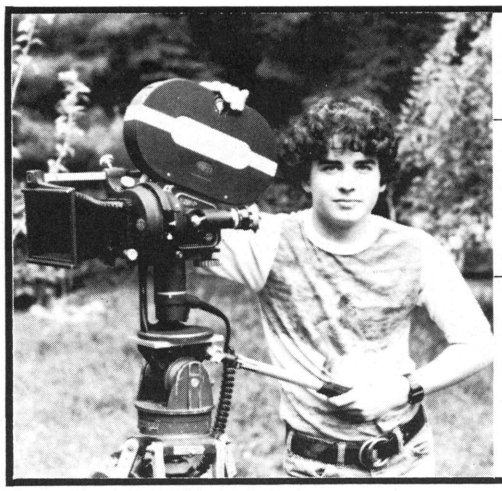

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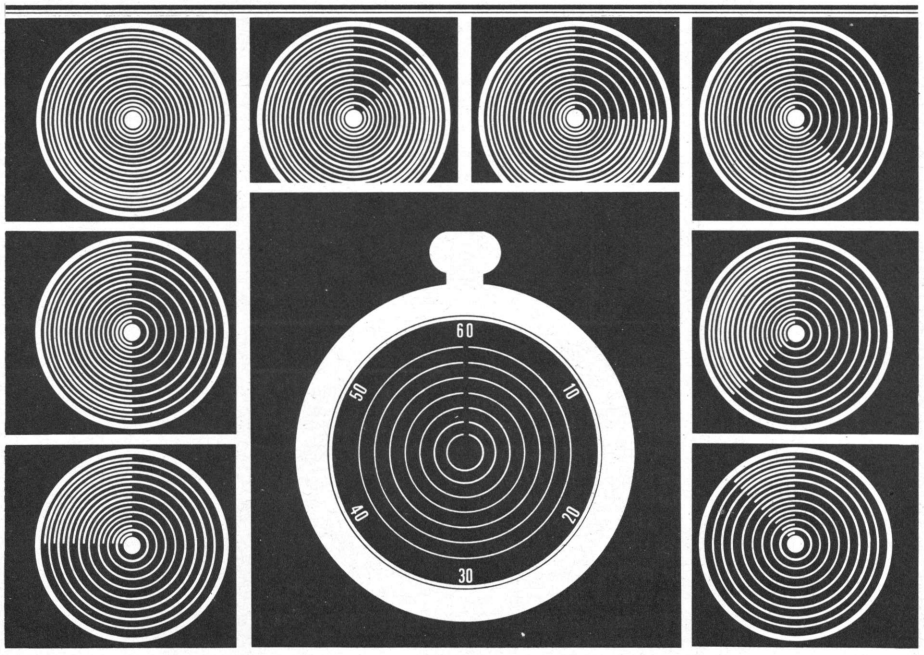

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MAGICAM MINIATURES FOR "STAR TREK"
Continued from Page 178

built in throughout the structure.

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At this point, the beginning stages of constructing the patterns and testing for the V'ger concept were coming together, and I was spending a major amount of my time working with Richard Taylor and Paul Kraus on the V'ger.

It was here that the change of command once again slapped a hold order on everything. We continued to detail and put the finishing touches on the Drydock model, waiting for word from the production as to what was happening.

In early January 1979, Douglas Trumbull was brought in to take over supervision of effects, and, for the third time, we began meetings and familiarization of the effects director with the models. The remaining models in our shop at that time were the Drydock and Work Bee Cargo containers; all others had been delivered long before and were in Astra's hands, leaving room for work on V'ger.

Doug began with his input and particular tastes for shooting the model, and we started to institute these changes. It was pleasing to see Doug so happy with the models—"I'm going to milk this for all it's worth," he said of the Drydock model. The model was finished, christened, and delivered to the Maxella facility where camera testing began the following week. However, added details brought the price back to the original budget—and added immensely to the look of the model. Here, the *Enterprise* and the Drydock were united for the first time, and it was a gorgeous sight to all of us who, through three changes of command, had labored to produce these gorgeous models.

At this point, many of our personnel went on to Maxella as model handlers for the duration of shooting. V'ger was pro-

duced in that facility under wraps by Greg Jein, I think. We went on to COSMOS, a PBS 13-hour special to air in 1980.

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(ABOUT THE AUTHOR: Jim Dow has designed and constructed numerous effects and miniatures since his first for film—the drones Huey, Dewey and Louie for Doug Trumbull's SILENT RUNNING in 1970. An Industrial Designer by training, he is now head of Magicam's special effects miniatures and props facility.)

BEHIND THE CAMERA ON "STAR TREK"
Continued from Page 181

There was one very tricky effect that we shot in the principal camera, rather than doing it in post-production. Persis Khambatta is shown inside a sort of unique cubicle taking a "sonic shower" to cleanse herself. The intent was for her to appear nude. You see the form of her body but no details. You see her nude silhouette and then, at some point there is a change of light and we all of a sudden see her fully dressed. She opens the door of the cubicle and steps out wearing a kind of silver tunic.

In order to get this effect, we utilized the front-projection technique involving 3-M Scotch-light material. We had the form-fitting tunic made out of the 3-M material, then put her in the cubicle and projected flesh-colored light through the beam-splitter onto her body, using a Rosco gel. She went through the various motions of taking the sonic shower, with a ripple pattern projected onto the face of the cubicle. That was created by means of a rippling device, with waves of water in a pan reflected into a mirror and then through the beam splitter. We turned off the sonic rippling device by means of a shutter and simultaneously turned off the flesh-colored light that was being projected onto her Scotch-light tunic. The light was now normal and she stepped out of the shower cubicle wearing the 3-M tunic that matched the silver outfit that she usually wore.

Because of the fact that we had to light the principle action to match illumination coming from effects that would be created much later in post-production, there was necessarily considerable

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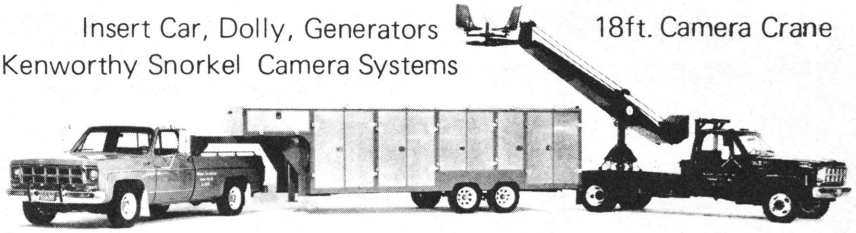

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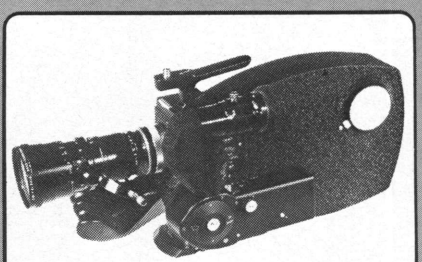

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guessing going on. Most of this guessing transpired during the filming of the sequences on the Bridge. We had to design ambient light that was supposedly coming from viewing screens that had some activity on them, so it became a matter of coordinating various colors, the intensity of light and the type of light to match a complex set of sequences. We had to set up multiple lights with dimmers and shutters and some flashing devices that would form patterns on the faces of the actors or the bulkheads of the Bridge. Generally they would build up and then taper off.

There were some sketchy, not totally complete descriptions of suggested effects that were incorporated into the script. The writers gave us a kind of hint and then left the rest of it up to us—to Bob Wise, Harold Michelson, Doug Trumbull and myself. It's awfully hard to put into words something in a science-fiction vein that exists primarily in the imagination and it did take a lot of talking for us to get our heads together and discover what to do. I think that we guessed well in most instances and gave the post-production units something safe and effective that would provide them with the flexibility they needed to create what had not yet been created.

Photographing STAR TREK—THE MOTION PICTURE was a tremendous challenge and a lot of hard work, but I can't emphasize too much how enjoyable it always is to work with Bob Wise. He knows every phase of filmmaking and, consequently, that makes our work easier and we can do a better job. There is never a time when you can't go to Bob and get a definite answer to any question you may have. He's always present; he's always thinking about the picture; he's always working ahead with the sketch artist or the Production Designer or the effects people. He's very close to his editor, having been a top editor himself. He's abreast of every element while you are filming. He's very considerate with actors. He's a perfectionist who will not settle for second best, but he also knows when you can go just so far in trying to get the best result. So he's not unrealistic. He's extraordinarily creative and, to my mind, the *complete* director. ■

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FAR-OUT PRODUCTION DESIGN FOR "STAR TREK"
Continued from Page 141

Among new sets conceived for the film was the three-story tall Recreation Deck, where more than 300 players represent much of the previously unseen 431-person crew of the Enterprise in a scene when Captain Kirk briefs them on the dangerous mission ahead.

"We decided to place it in the saucer of the ship, facing the rear," Michelson explains. "Thus, we could have big windows at one end to look out on other parts of the craft and, by a huge, painted backing, show the orbital dock holding the *Enterprise* during its refitting. In this way, viewers can tell where we are and get an idea of the space beyond.

"It meant cutting holes in the wing of the *Enterprise* model to make the exterior match this interior set.

"Besides all the furnishings which had to be designed and built, there were futuristic, electronic games to be conceived for the Recreation Deck. One, devised by assistant art director John Cartwright, was a chess-like game, with chessmen made of plaster that light up as they move up and down.

"Another was a big, shuffleboard-type game built into the floor. Played with hand-operated controls, it depicts a battle between space ships. People had a lot of fun playing it on the set between scenes."

Although the design (or, more accurately, *redesign*) of various areas of the *Enterprise* was the top priority item, there were other complex sets which also had to be created. These included a section of the planet Vulcan (home base of Mr. Spock), a San Francisco terminal of the 23rd Century, and the massive outer space craft that serves as the repository of the alien force known as "V'ger".

On the planet Vulcan, Spock is seen meditating and participating in a quasi-religious ceremony presided over by elders of the culture, before being summoned to rejoin the Earthlings aboard the *Enterprise.*

"The sequence is played in an exterior set that has the feel of the Valley of the Kings in Egypt," says Michelson. "There are tremendous statues of former leaders of the society who are buried there and the action takes place near the foot of one of these statues.

"In the original sketch this was to be a red planet, in order to indicate definitely that it was not Earth. The final tones are reddish and yellowish and the terrain is a vast desert. We did not construct the entire thing, of course. We built a small mountain and a foot of one of the statues (about 10 feet long) and the rest was a

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matte painted by Matthew Yuricich.

"All the rocks in the segment we built were of poured Styrofoam which was then painted. There was also some water in the set and we used the back end of the tank at Paramount."

The San Francisco Terminal set appears on the screen for only a few minutes at the very opening of the film, but its design and construction was a most ambitious project.

"What was called for was a kind of United Nations type of Grand Central Terminal," says Michelson. "Scalewise it had to be absolutely tremendous, with heavy, heavy pylons holding everything up and escalators to the various levels. I laid out the storyboard and the set took up an entire stage at Paramount. We did a terrazzo-type marble floor and put in columns of a huge scale, knowing that the rest of the set would be a matte painting. In the sequence we see a spaceship coming in from Sausalito, heading towards a hole in the mountain and landing in this vast terminal. We had to lay the set out in such a way that Doug Trumbull could do a miniature of the spaceship coming out of the sky and landing."

Certainly the most exotic and "otherworldly" set in the entire film is that of the "V'ger" entity. Seen first by the challenging astronauts as a gigantic cloud-shrouded mass, it comes into focus (once the clouds have dissipated) as a globular vehicle with a vaguely vaginal opening guarded by a hymen that looks like the multi-leaved iris of a camera lens shutter.

Once the *Enterprise* (as tiny in relative size as a sperm cell swimming upstream) manages to penetrate the portal, the crew members of the starship step out onto a majestic promenade leading to a vast bowl-like arena, bathed in pulsating colored light, at the center of which rests the Voyager VI ("V'ger") space explorer.

"We had endless discussions about what this series of sets should look like," relates Michelson. "We had to decide first what this monster was. The theory was that it came from another planet populated by intelligent beings. The beings had created a lot of machines and robots and had then died. But the machines and robots had kept going. What is left is a machine without a soul, but a machine that is looking for the Creator.

"Since it was a machine, we decided to stay with a sort of aluminum feeling. We didn't want to get a lot of curves into the design, which would have given it an organic overtone. Yet, we felt that the machine should have a certain feeling of life, so we used light to lend it a pulsing effect.

"It was a weird challenge. The machine was a thinking thing that had gathered a fantastic store of information from the be-

ings that had created it—and now it was on its own, looking for God. Many designs were made for this sequence, but I never did know until the end what the exterior of the V'ger entity would look like, because Doug Trumbull had to design that part of it, in accordance with the special effects."

Asked about his working relationship with Director of Photography Richard Kline, ASC, Michelson says, "We related very closely and would consult with each other whenever possible. However, the schedule was so tight that often there was no time for consultations. I would be drawing like mad and Dick would be busy shooting, which made it very difficult to touch base. However, I would always let him know what my intentions were and he was agreeable almost to a fault. He just went along with whatever was presented to him and made something great out of it.

"For example, in one set there was a sliding door made of smoked glass, which was very reflective. Dick took advantage of that reflectivity, which otherwise would have created problems. He would shoot into the glass and pick up reflections of people approaching. Then the door would slide open and you would get this extra dimension of reflections and shadows that would enhance the effect. When I designed the glass door I didn't do it with the intention of reflecting anything in it, but Dick took full advantage of it. You would see the reflection of someone approaching the door. Then, all of a sudden, the door would open and he would disappear, but you would see another room beyond. It was very interesting.

"I only wish that we could have had a bit more lead time to work with the group that was involved with special effects. So often we were flying blind. The schedule was very, very tight and there were so many commitments to be met, that often we would be working in front of a big blue screen, with that part of the image to be filled in later by someone else."

Michelson, 59, has been in the movie business for 30 years, graduating from illustrator to art director to production designer. A native New Yorker, he prepared for his career at the Art Students League in New York, where he enrolled under the G.I. Bill after serving in the Army.

His past films include MAME, CATCH-22 and JOHNNY GOT HIS GUN.

Just before being beckoned for STAR TREK—THE MOTION PICTURE, Michelson was on another film assignment in Huntsville, Alabama, a center of America's past rocket development and space programs. He spent many spare hours in the local Space Museum, and became fascinated. ■

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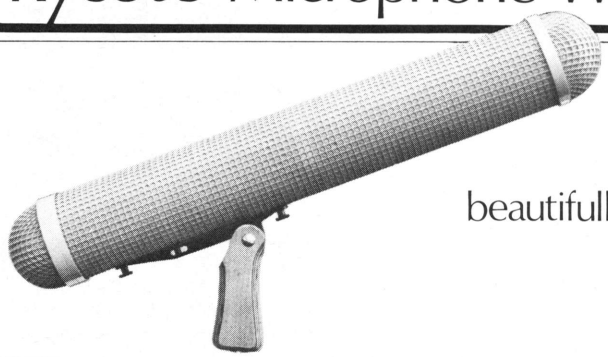

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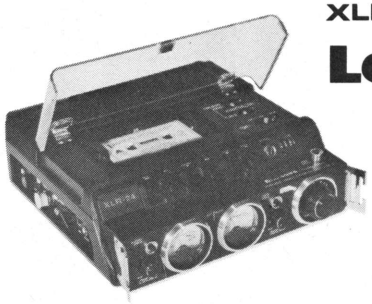

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"Then, I remember taking telephoto pictures from my hotel of the pioneer Space Shuttle, *Enterprise,* coming in on top of a 747. And, I was even more excited when our movie people were invited to see the Space Shuttle after its landing. I was even able to go aboard and study it closely."

A week later, he received a phone call from director Robert Wise. "How would you like to redesign the *Enterprise*?" Wise asked.

"Coming at that moment, it was a startling question," Michelson says. "My mind still was occupied with the Space Shuttle. How could I know he meant the movie space ship *U.S.S. Enterprise*? At any rate, as soon as I realized what he meant, I said that I would absolutely like to do it, even though I didn't know anything about the picture. Just the fact of working with Bob Wise on a science-fiction subject seemed like an overwhelming combination. Bob Wise is a very special person and working for him is such a pleasure that you really break your tail to give him your best.

"Of course, I had a lot of help on this project and there was a marvelous group of people who worked on it. All of them were terrific—the cameraman, the actors, the other technicians—the whole group. For me it was a great experience." ■

KNXT MARATHON PROGRAM WINS COMPETITION

Continued from Page 165

was finding the sequences they wanted in the brief time left for final editing. "A better method of logging what we recorded would have helped a lot," Cosgrove says.

"Overall, it was a tremendously exhilarating experience," he adds. "It proves there is a lot more to covering sports on TV than turning the cameras on at a game."

It also shows that local stations can work with independent producers to develop some extraordinary programming. "We develop many programs with local stations that are later syndicated either as direct sales or barter," Cosgrove says. "The station buys a special for the cost of production and gets a program they might not have the staff or time to do. They then license us to sell the program to other stations."

In the case of *"Saturday Morning Fever,"* it was obvious it was a one-shot deal. "The key to this program was its timeliness, and the fact it involves local people participating in a popular sport," Cosgrove says. "We didn't try to sell it in other markets. It was almost a loss leader for us, but it is a program we were very proud to produce." ■

VERY SPECIAL EFFECTS FOR "STAR TREK"
Continued from Page 174

QUESTION: By "multi-level" do you mean similar to the Multi-Plane system they used to use for shooting cartoons?

DYKSTRA: Yes, basically it's the same thing—different levels within a cloud moving at slightly different speeds to achieve some sort of pseudo-perspective.

QUESTION: What were the various film formats used in creating the effects?

DYKSTRA: This show had many formats. The original photography was in 4-perf anamorphic. We shot in VistaVision. Doug shot in 65mm. I believe Bob Abel shot some extremely high-speed explosion stuff in 16mm. There was some flat 4-perf running around someplace and I wouldn't be surprised if there wasn't some IMAX somewhere in this show.

QUESTION: You spoke of enhancing the effect of the Transporter in a couple of ways. Just what did you actually do?

DYKSTRA: The original photography of the Transporter was reduced. We then lined it up and shot a laser tube—which was actually a laser scanned against a rotating wire to achieve a tube-like effect. Then the sparkle was just regular old sparkle with a bit of distortion added to it in order to give it a little bit of different motion from what they originally used in the TV show.

QUESTION: Could you tell me a bit about how the Energy Probe sequence was done?

DYKSTRA: The Energy Probe sequence passed through many peoples' hands. It was one of the toughest sequences to execute in such a way that Bob Wise would like it. What happened originally on the set was that they built a very large lamp pole and had a gaffer walk around in the set with this pole. I don't even know what it had on it for lights, but the effect was really good, because it did give the light source some sense of movement and provided the reactive lighting on the faces of the actors everywhere in the set. Of course, it looked kind of funny in the original photography. Here's this guy with sunglasses walking around, holding up this giant light stick and occasionally sticking his shoulder into the scene. I think that if you look closely at the finished movie you will see a couple of cuts in which this guy is reflected in

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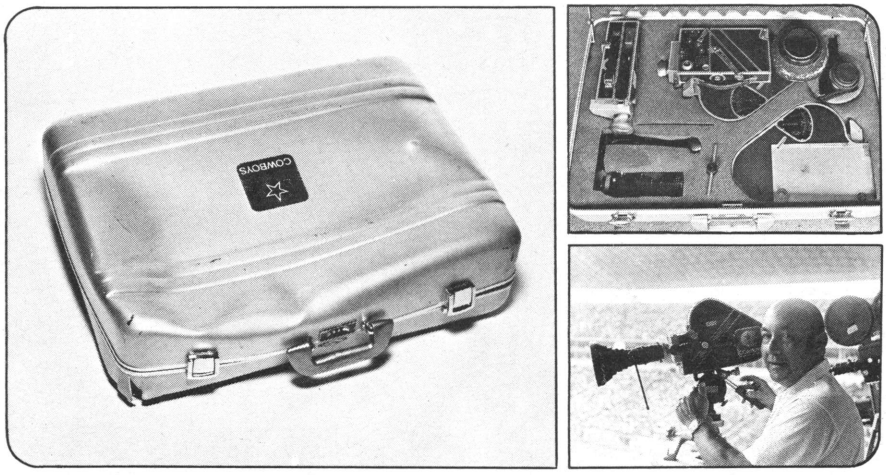

It was just another "road trip" for Bob Friedman, head of the Dallas Cowboys Football Club Film Department. Responsible for transporting the expensive motion picture camera equipment the team takes to their professional football "away" games...he is accustomed to seeing one of his Halliburton cases fall off an airplane baggage ramp and skid across a runway, or even fall from the baggage bay of a jet to the ramp. But the ultimate accident happened when his equipment was being removed from a chartered jet in Los Angeles. He reports: "The equipment cases were lined up outside the airplane waiting to be loaded on our equipment truck when a ten ton truck, used to clean out the airplanes, backed over one of the camera cases. The case was destroyed—almost mashed flat—and not one piece of the equipment was damaged—a great tribute to our Halliburton cases. Thanks for supplying us with a great product."

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one or two of the panels. We didn't have time to go through and matte all that stuff out.

QUESTION: But you did eventually have to get that guy out of there and print in the effect of the Energy Probe. How did you get rid of him?

DYKSTRA: The way we removed the guy was simply to project the scene onto a flat pellicle and then insert a probe into the area where he existed and "squeeze him out", so to speak. By distorting the mirror, you can make any particular portion of the scene disappear.

QUESTION: What sort of mirror is it?

DYKSTRA: It's a fully front-surfaced mirror with complete reflectivity. It's a big flat surface, somewhat like a controllable fun-house mirror—only controllable in a much smaller area. If you take a flat mylar mirror and poke your finger into the back of it, you'll make a little point where your finger is and that becomes a lens, basically. I don't know exactly how it works (optics are black magic anyway, and your soul could disappear), but you can make a portion of an image vanish by controlled distortion of that mirror. You can take the guy who was walking around with the light pole and make him kind of be sucked out of the scene. You can tell that's what happens because in one take as the probe passes across the screen from left to right, everybody is sucked into the area where the probe is and moves two feet toward the right.

QUESTION: Awkward! But seriously, once you've sucked the guy with the light out of the scene, how do you cover the area distorted by the probe?

DYKSTRA: By superimposing over the distortion itself the dazzling effect for the Energy Probe that we finally came up with, and which Bob Wise liked.

QUESTION: How was that "dazzling effect" created?

DYKSTRA: It was based on a moiré pattern by Harry Moreau. Harry's worked with moirés before, and Bob Swarthe, who was very instrumental in getting this movie made, was developing some moiré patterns for the closing sequence of the show, so it just seemed appropriate to use moirés. It's basically just a moiré effect that results from two patterns being moved against each other in such a way as to provide points of light that have apparent three-dimensional motion. It was shot on an animation stand with two or three passes through the

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camera, and then tracked to the original photography (after it had been distorted, of course). Because the distortion changed the scene significantly, if the moiré pattern had been tracked to the original scene (undistorted) it never would have fit. It's basically an animation gag.

QUESTION: How did you create the effect of the electrical discharge that V'ger uses to destroy the Klingons?

DYKSTRA: The energy weapon which the V'ger cloud uses we called the "Whiplash Bolt" and it was created by having a Tesla coil photographed with the camera coming towards it (to make it look like a ball of electrical discharge moving towards you) and then double-exposing onto the same piece of film a very high-flare quality coming from a tiny xenon bulb. Harry Moreau then had that real electrical discharge available, as well as doing a lot of research in lighting and other elements to come up with an animated lightning that would work, and I think he succeeded. It's the first animated lightning I've seen that I thought was really effective.

QUESTION: Can you detail a bit more specifically just where the animated electrical discharge was used and where the real electrical discharge was used?

DYKSTRA: Well, the image that is on the screen during the Energy Probe sequence is all animated electrical discharge. The real electrical discharge shows up in the Klingon sequence where the cloud fires its weapon and that great ball of blue energy comes out and envelopes the ship with electrical discharge all over its surface. It is real lightning done on a form that exactly matches the contours of the ship. Bruno George and David Sosalla sculptured a lot of those forms in the same shape as the ship. They matched them up in the format and then photographed the electrical discharge actually crawling up over the surface of the forms.

QUESTION: Can you tell me a bit about the work you did on the V'ger sequence?

DYKSTRA: The introduction to V'ger was basically photographed in a smoke environment, both for what we call "The Maw" (which was where the Enterprise *was drawn in) and V'ger itself, which includes the initial flyover pass that was done over the big blue thing. Chuck Barbee and John Sullivan, working with*

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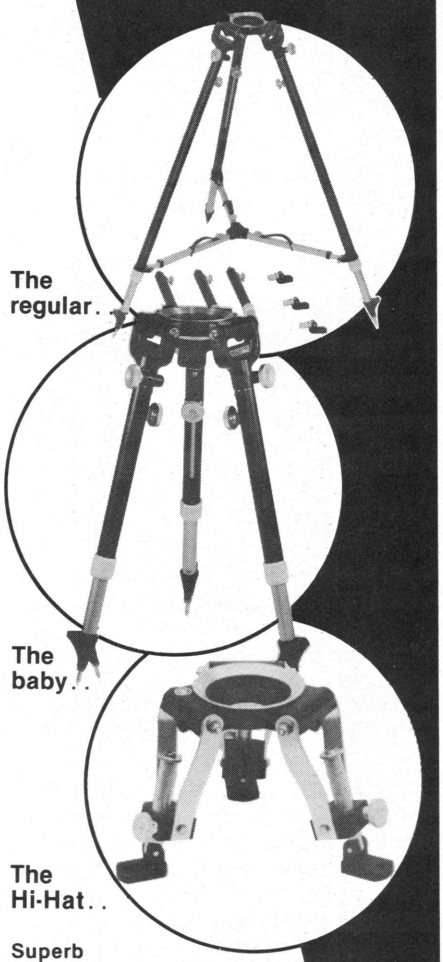

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their crews down at the Annex, came up with the best ways to photograph the thing. They were highly instrumental in formulating the concepts of how the thing should look in terms of the lighting.

QUESTION: How big was the V'ger model, the "big blue thing" shown in the flyover pass?

DYKSTRA: The V'ger model itself was 68 feet long and it was lighted with incandescents, neon tube, fiber optics, rear projection and lasers. It was what you might call your basic potpourri of lighting techniques. The cloud that appears over the ship in many of the scenes was laser-scanned smoke. It was all put together in the camera. The Maw was another model—quite an articulate one—that we installed in a smaller smoke room that was just set up out on the stage in our studio.

QUESTION: You called it quite an articulate model. Just what does that mean in this case?

DYKSTRA: It was a pretty tricky thing that the guys worked out, in terms of its action. The model shop figured out how to make the whole thing go together. Almost all of the models we used ended up having precision machining on them. Sometimes the machine shop guys had to machine a piece of really crummy plastic because it had to be precision fitted onto some metal part. Getting back to The Maw model—it had to be shot with a very slow rate of photography. We used our other motion control system to shoot that and the footage was combined, in many cases, with material from Doug's facility because he had the big model of the Enterprise. *Because of that, we had him shoot some* Enterprise *pieces for us and they were reduced from 65mm to VistaVision. The VistaVision was then composited (using reduced mattes—which was pretty phenomenal) with The Maw. The surface of The Maw was highly detailed and the lighting for the surface was included in the model. By putting different pieces of artwork and different gels into that area, you could achieve a different look for that surface. Several passes were made over the surface in order to create the final result. Once you get inside the Maw you see mainly the stuff that Doug shot—great balls and lines of light and the aperture that opens and closes.*

QUESTION: How was that last piece shot, where V'ger transcends or transforms or whatever it does?

DYKSTRA: That was done with strobes.

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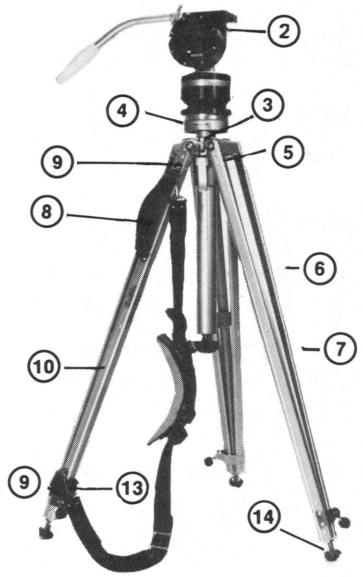

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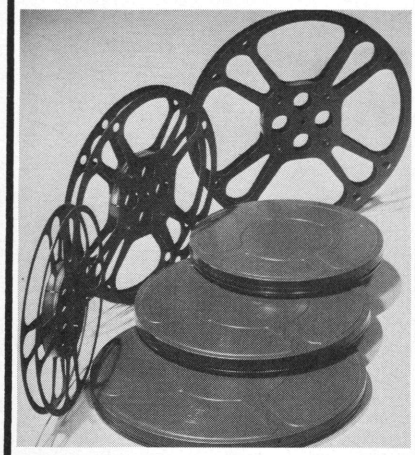

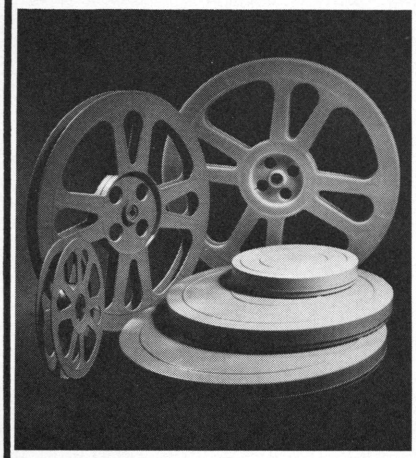

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We used strobes extensively in the photography of V'ger itself in order to achieve different kinds of light effects, because we wanted to go four, ten or fifteen times over-exposed, without having to put two arc lamps on the floor. We were shooting at T/22 plus in many cases.

QUESTION: Didn't you use the Continental Camera Systems Pitching Lens for some of your shots?

DYKSTRA: Yes, and it worked out really well for us. I was also very pleased with the service they gave us on the thing. Getting back to the strobes—that end shot had some 48 or 50 100-watt strobes aimed at the underside of the model. It came up through the model and created shafts of light. Again, Harry Moreau had to go in and add some moiré stuff to the little openings of the interior of the model, and then he did a streak trick on the moiré at the end of the thing, when it kind of expands to fill the frame. From that it's a cut to the big atomic shock wave that Doug did.

QUESTION: Now that it's all over, do you have any final observations about the experience?

DYKSTRA: Yes. The experience was unique and very special in several ways. For example, it was amazing how everyone on the show offered some input as to what the effects should look like. A modelmaker would come in and say, "Listen, I have this great idea for a way to light this." Then he'd talk to whoever was in charge of photographing that shot and they would get together and work it out. It was really great in that sense—a totally collaborative effort. I can't express that strongly enough. What was incredible was getting that number of creative people together for that long a time without having them kill each other. But it worked out just the opposite. They did everything to help each other—and I believe that the result on the screen shows it. ■

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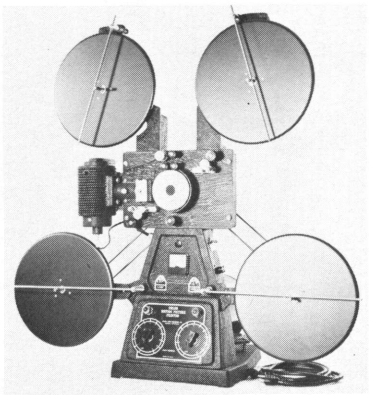

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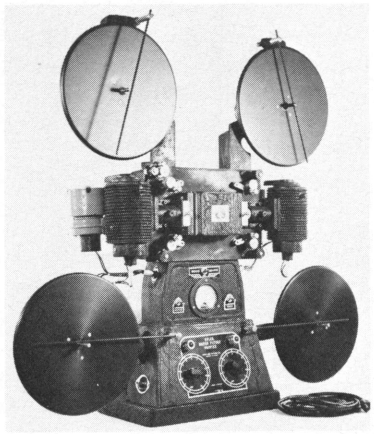

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SYNTHESIZED SOUNDS FOR "STAR TREK"

Continued from Page 161

for the initial firing of the light projectile, but the pass-bys seemed to require more violence than we could coax from the synthesizers. Searching for the ultimate "whoosh," we grabbed the nearest fire extinguisher and transported it outdoors.

It was a dark and foggy two-o'clock-in-the-morning as two of us bundled into the company truck, ready to begin the ordeal. We accelerated to the speed of 50 m.p.h. or so while approaching the studio, and shot the contents of the fire extinguisher in the air from the moving vehicle as we rushed by. Two other brave staff members recorded the entire affair from a stationary and hopefully safe spot in front of the studio, keeping their AKG 414 microphone carefully within twelve inches of the speeding truck. Amazingly enough, this worked on the first take—no time to practice technique here. This sound, with another half-dozen overdubs, was our main element in the effect.

Synthesizers and fire extinguishers were not the only sound sources employed. One morning we received a call from Jerry Goldsmith, whose superb score (beautifully edited by music editor Ken Hall) makes an outstanding contribution to the overall effect of the picture. He suggested that we record some naturally produced sounds, reassuring us that we would be impressed with how other-worldly (and therefore appropriate) some of the naturally generated effects could be. Specifically, he suggested that Emil Richards, a noted percussionist, bring in his personal collection of the world's most bizarre percussion instruments, including some of the imaginative creations of the late Harry Partch, *avant-garde* composer and instrument designer/builder. At the subsequent sessions, we opened our ears to some very strange and beautiful sounds, many of which found their way into the film. The high and eerie sounds that keep moving way in the background are Partch's "rub-rods," played by Emil Richards.

Though our liaison with visual effects experts Doug Trumbull and John Dyskstra was good, we would have preferred to work even more closely with them, as we feel that more feedback between our two areas could really make the science-fiction fly. One cooperative effort that worked out extremely well was John Dykstra's contribution of a modified Tesla coil sound (an electrical arcing effect), to our efforts at finding a suitable sound for the "digitalization" effect (in which V'ger turns matter into data and stores entire spacecraft, even planets, as data). All we really needed to do was pad that basic sound with some backing tracks, digital delays, and then multiply it by twenty or so by recording the same sound on twenty different tracks, each one slightly out of sync with the others. Subsequent remixing took further advantage of the multitudinous processing possibilities, eventually resulting in the finished sound.

Some of the most important sound effects in the film occur during the final confrontation at V'ger's heart, near the original Voyager VI spacecraft. Robert Wise asked that these sound effects, the "voice of V'ger," sound like a living machine trying to speak, and yet not sound like a voice. He asked us to strive for some delineation of emotion in V'ger's audible responses to the inflammatory situation at hand. We did our best. We tried everything. A lot of things worked quite well. But the director knew exactly what he wanted, and though it took us awhile to obtain it for him, it was worth the wait. A very strange assortment of unusual sounds issues from V'ger in that sequence. One of the sounds lurking in the atmosphere behind V'ger is the voice of Joel Goldsmith groaning, slowed down to about one-tenth its normal speed, with plenty of digital delay applied. Another more prominent sound was created by physically slapping a piece of carefully over-modulated two-inch tape against the heads (gently), and sending the resultant outburst through a series of echo chambers.

The final dubbing took place in Goldwyn's dubbing room D, for the Dolby stereo optical format with matrixed surround effects. As may well be imagined, the quantity of material submitted for final dubbing was prodigious. Luckily, the extremely competent mixers at Goldwyn, under the capable direction of lead mixer Bill Varney, were able to handle all of the required material *and* stay on a very tight schedule.

The organized teamwork displayed by Richard Anderson and his crew of sound effects editors was remarkable. As the picture neared its deadline, Richard, Steve, CeCe, George, Collin, and Alan accomplished remarkable amounts of work in limited amounts of time. Their efforts were matched only by the last-minute magic of editor Todd Ramsay with director Robert Wise, who managed to create a highly complex and artistic film while working under incredible pressure. Robert Wise modestly, and narrowly, escaped the toast he deserved following the final dubbing of the last feet of film. Here's to *you,* Bob. ■

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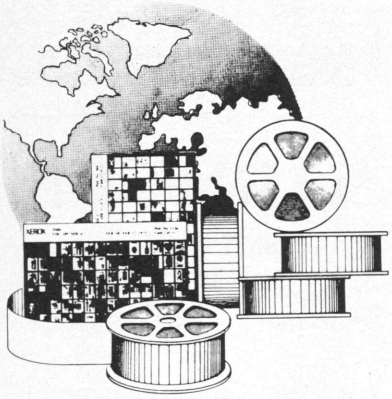

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PRESIDENT OF A.S.C. AT B.S.C. OPERATORS NIGHT
Continued from Page 168

and be employed in any filmmaking centre of the world on any film project for which their particular talent is most suited." It seemed that not a single British Director of Photography whom he met would disagree with him and all wish him success with his "Master Plan".

After his speech Bill Fraker was made an Honorary Member of the B.S.C.

The meeting then got down to the presentation of the B.S.C.'s Golden Camera awards for achievement in pictures released during 1978. These awards are particularly valued by the Recipients as they are voted upon by their own peers. There is one award for Best Cinematographer and, when the occasion warrants it, a second award for a Technical Contribution.

The Technical Contribution Award for 1978 went to Denys Coop for the Process Photography of SUPERMAN.

The Award for Best Cinematographer, for the fourth time, went to Douglas Slocombe for JULIA.

The following evening Mr. & Mrs. Fraker were Guests of Honour at a reception at the home of David and Elaine Samuelson.

Among their fellow guests were Jack Cardiff (Academy Award for BLACK NARCISSUS), Denys Coop (SUPERMAN Special Effects), Jack Hildyard (BRIDGE ON THE RIVER KWAI), Bob Krasker (THE THIRD MAN), Walter Lassally (ZORBA THE GREEK), Ossie Morris (FIDDLER ON THE ROOF), Freddie Young (LAWRENCE OF ARABIA, DR. ZHIVAGO and RYAN'S DAUGHTER), Douglas Slocombe and Billy Williams (both Oscar nominees), Alan Hume, Gerry Turpin and Harry Waxman (all past Presidents of the B.S.C., and Alex Thompson (Vice President of the Society).

The B.S.C. is honoured that the President of the A.S.C. should have made this journey to be with them and hope it will be a start of an even closer cooperation between the two Societies. ■

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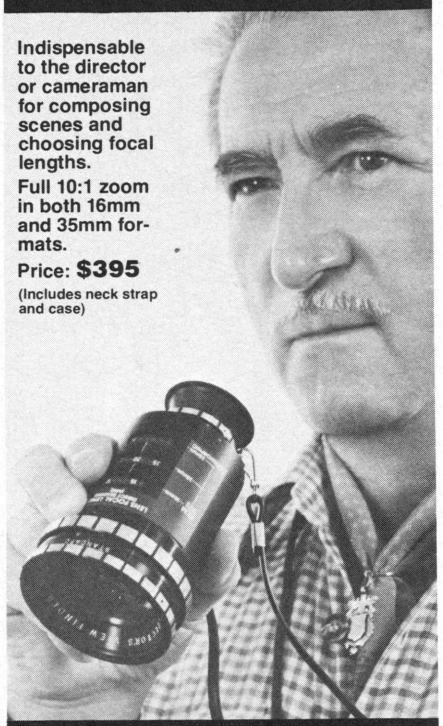

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INDUSTRY ACTIVITIES

RAYMOND CHOW'S GOLDEN HARVEST FORMS NEW ALLIANCES

In a far reaching international financing and distribution arrangement involving major producers, directors and stars, Raymond Chow, under his Golden Harvest banner, has announced a major production slate and simultaneously the exclusive worldwide distribution arrangements with Classic Film, a massive new film financing and production organization.

In revealing three separate arrangements, Chow announced deals that involve major elements, among them stars such as Charles Bronson, Jackie Chan, Hardy Kruger, Roger Moore, Telly Savalas and Jaclyn Smith, as well as creative talents like Robert Clouse, Fielder Cook, Michael Grais, Paul Heller, Brian Hutton, John Milius, Hal Needham, Sam Peckinpah, S. Lee Pogostin, Al Ruddy, Mark Victor, Fred Weintraub and Brock Yates.

Chow detailed his association with Ruddy on two separate pictures to be made under the Albert S. Ruddy Productions banner. In addition, the two will function as Executive Producers on three pictures to be produced and totally financed by the Classic Film organization, recently formed by a group of German investors.

Furthermore, Chow revealed a separate production arrangement with producer Fred Weintraub to round out the Golden Harvest immediate production and distribution slate of six films at a budget totaling more than $60,000,000.

The first of the two Ruddy films is: CANNONBALL, a contemporary action adventure comedy to be directed by Hal Needham from an original first screenplay by famed auto racing writer Brock Yates. The film is a wacky story of many different participants in a 3,000-mile automobile race from the East to the West Coast. The second is THE TEXANS, a unique contemporary concept, to be directed by Sam Peckinpah from an original screenplay by John Milius.

Chow's deal with Weintraub renews an association that was internationally successful on ENTER THE DRAGON. The pair will again be joined by director Robert Clouse on BATTLECREEK BRAWL, a contemporary action drama, with Weintraub producing for executive producer Chow from an original script by Clouse. A start date of January 8 has been set on

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the film, which will star Jackie Chan, the top boxoffice star in the Far East today and the most important film successor to the late Bruce Lee.

Under Classic Film, which promises to become one of the industry's most important international film production and financing groups, Chow and Ruddy will be Executive Producers on an initial group of three pictures representing a $31,000,000 budget. The films are:

ARCTIC RAMPAGE, a rugged action adventure based on the true story of Albert Johnson, who, in 1930, became the object of the biggest manhunt in the history of the Royal Canadian Mounted Police. Charles Bronson will star in the film, which begins shooting next February in Canada. Telly Savalas will also star in the film for which another major male co-lead is now being sought. Michael Grais and Mark Victor wrote the screenplay.

HIGH ROAD TO CHINA, a Paul Heller production of a sprawling action-adventure story about the amazing flight of three Bristol aircraft flying across Europe and into China in 1928. Roger Moore will star, with Brian Hutton directing from a screenplay by S. Lee Pogostin. Another major male and female star will be announced shortly for the film, which will begin shooting in May of next year on locations throughout Europe and the Orient on a $16,000,000 budget.

HORIZONS, based on the top-selling German novel, *Schallmauer,* by Hardy Kruger and starring Kruger himself with Jaclyn Smith soon to be set as the female lead. Fielder Cook directs the film from a screenplay by S. Lee Pogostin. A love story with an aviation background, the picture will be shot in the United States and Germany, beginning next June.

Classic Film will be entirely funded by German investors and headed by Paul Sapounakis and David Shepherd as co-managing directors and George Föcking as general manager. German counsel for the company is Dr. Wolf Schwarz of Munich and Jim White, of the firm of Wyman, Bautzer, Rothman and Kuchel, represents the company for legal counsel worldwide.

Complex negotiations for the organization of Classic Film have been underway for the past year. Michael Levy of the Paul Kohner-Michael Levy Agency was instrumental in bringing the company together with Raymond Chow and Al Ruddy. Classic Film is now fully equipped to handle both financing and production on an international basis. Under the exclusive Golden Harvest distribution agreement for Classic Film product, Richard B. Graff will represent the films for domestic distribution and Howard Goldfarb will handle foreign sales. ■

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"STAR TREK"—THE UNIVERSE AND BEYOND

Continued from Page 176

THE MOTION PICTURE was written by Harold Livingston, story by Alan Dean Foster. Livingston's first book, written in French, was "Pilots San Visas," and it detailed his adventures flying missions in Israel. He has written seven books, and scripts for such films as ESCAPE FROM MINDANAO and THE SOUL OF NIGGER CHARLEY, as well as for more than 100 television shows. One of his most recent books, "Coasts of the Earth," won for him the Houghton-Mifflin Fellowship Award. Foster has published hundreds of articles in national magazines, and his first novel. "The Tar-Aiym Krang," was published by Ballantine Books in 1972. A representative collection of his articles, "With Friends Like These," was published by Del Rey Books in 1977. Much of Foster's longer work takes place within the framework of a future society known as the Universe of the Commonwealth, where mankind has forged a semi-symbiotic relationship with a race of insects, the Thranx. Foster is also the author of numerous movie novelizations such as "Alien," as well as the ten-volume "Star Trek Log" series.

Director of photography Richard Kline, ASC has lensed such films as KING KONG, CAMELOT, THE FURY, THE ANDROMEDA STRAIN and WHO'LL STOP THE RAIN?

Jerry Goldsmith, composer and conductor of the music score, was an Academy Award winner for THE OMEN and three times an Emmy winner (*"Babe," "QBVII"* and *"The Red Pony"*). He earned Academy Award nominations nine other times—THE WIND AND THE LION, CHINATOWN, PATCH OF BLUE, THE SAND PEBBLES (which was also directed by Robert Wise), THE PLANET OF THE APES, PATTON, PAPILLION, FREUD, and for the song *"Ave Satani"* from THE OMEN. STAR TREK—THE MOTION PICTURE is the 84th film score composed by Goldsmith.

The monumental task presented by STAR TREK—THE MOTION PICTURE also included the designing and manufacturing of more than 700 costumes, supervised by Robert Fletcher, who brings to the film a background as one of the most outstanding costume and scenic designing talents of the American theatre. Among the costumes were the new uniforms for the *Enterprise* crew and the native robes and gowns of the many aliens created for scenes in the film. Special costumes were created for the inhabitants of far-flung worlds: Vulcans, Deltans, Klingons, Rigellians, Andorians, Arcturians, Betelgeusians, Megarites, Kazarites, Saurians, K'nor-

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mians, Rhaandarites, Zaranites and Aaamazzarites. To meet the challenge, Fletcher was able to draw upon three decades of creativity, ranging from ballet and opera to ice shows, television specials, and the Broadway stage.

The strange races from other imaginary planets also meant an added challenge for a crew of 17 make-up artists. Fred Phillips supervised the complex assignment. Phillips is acknowledged as one of Hollywood's finest experts in his field. Phillips learned his art from his father, an early make-up specialist, and now is assisted by his daughter, Janna.

Responsible for designing many of the elaborate sets for STAR TREK—THE MOTION PICTURE were two of Hollywood's veteran production designers. Harold Michelson has been production designer on such films as MAME and CATCH-22, and Leon Harris has been associated with 165 motion pictures, beginning as an illustrator on such films as CLEOPATRA, WEST SIDE STORY, HAWAII and EAST OF EDEN.

Phil Rawlins, who had been a young assistant director on the *"Star Trek"* television series, served as production manager on STAR TREK—THE MOTION PICTURE. Jon Povill was associate producer on the film.

Complex and technologically advanced photographic effects for STAR TREK—THE MOTION PICTURE teamed the screen's two acknowledged creative leaders in the field—Douglas Trumbull and John Dykstra. Trumbull has been widely recognized and honored for supervising the optical effects for CLOSE ENCOUNTERS OF THE THIRD KIND and 2001: A SPACE ODYSSEY; Dykstra for STAR WARS and BATTLESTAR GALACTICA.

STAR TREK—THE MOTION PICTURE was not the first project on which the two have paired to achieve spectacular results in special photographic effects, nor their first association with director Wise. Dykstra was a special effects cameraman and designer with Trumbull on THE ANDROMEDA STRAIN, directed by Robert Wise, and on SILENT RUNNING, a space drama written and directed by Trumbull.

The phenomenon of *"Star Trek"* created a tremendous enthusiasm for STAR TREK—THE MOTION PICTURE. When the series completed its three years on the NBC-TV network, a strange thing happened. It refused to be forgotten.

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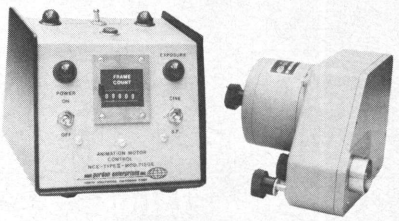
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"Star Trek" began before man walked on the moon, at an age when the exploration of space was still a far-flung dream on the drawing boards. The advances of a decade have been incredible, and what lies ahead is conjecture for those with crystal balls. All we know is that what lies beyond our world and our comprehension is something vast, a limitless realm. STAR TREK—THE MOTION PICTURE has been meticulously crafted by hundreds of tremendously talented and dedicated people to whirl the viewer into that breathless excursion through uncharted space.

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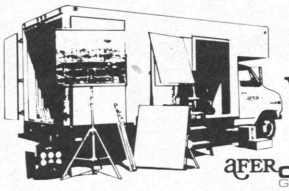

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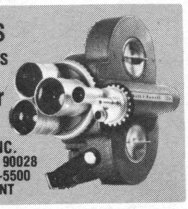

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SIEMENS 16mm double system interlock projector, amplifier, 2 lenses, all features, perfect condition, $1700. (714) 292-7612.

Zeiss 10-100, Arri mount, mint, $1500. Beaulieu R-16, 17 to 85, $1000. Angenieux 12-120, C-mount, $1200. Cine-60 flat base, $350. 50mm Schneider lens, $75. Wanted Distagon 16mm, & O'Connor 100-C. (213) 994-1055.

HONDA mini-camera car, under 2,000 miles, sell or trade for portable 35mm xenon projector. (301) 596-6969.

PRINTER Peterson 16mm picture and sound head, B&H 35/16 printer, Depue printer parts developing machines, pumps, projectors 35mm. Additional varieties equipment available, call with your requirements. NEPTUNE CORPORATION, 115 W. 45th St., New York 10036 (212) 765-4785.

MOVIOLA 16mm editor, UL20S, $2,200. Also UL20-2S $2700. Harwald 16mm cleaning machine, $2000. Eclair NPR, CS motor, 9.5-95mm Angenieux, 2 mags, battery, $4950. Arri 35 11CB, crystal motor, 2 mags, 25-250mm Angenieux, Arri brace, $9750. SAWYER CAMERA & SOUND. (213) 466-6111.

ANGENIEUX 9.5-57 w/zero finder, TV reticle, Frezzolini index rings, case, new cond, $2,275. JACK CHAPPELL, 10,000 Mosby Rd., Fairfax, VA 22032 (703) 273-6254.

ARRI 16M, two magazines, three prime Cine Xenon lenses, battery and charger, case and other items, $3000. CHARLES E. KING, Box 535, Wichita Falls, TX 76307. (817) 322-6806.

MILLER head, Senior fluid action; Mfg. in Sydney, Australia, including fiber shipping case, with Birns & Sawyer Model # VG 100 Jr., tripod, complete, $250. Magnasync Moviola synchronizer, Model SZA-Spec., one wheel, with hr, min, sec, timer, $70. Neumade film measuring machine, model HM-5-D, with two wheels and footage counter, black finish, $40. All above shipped prepaid, satisfaction guaranteed. BOB O'REILLY, 319 Millside, Fort Wayne, IN 46807.

CINE SPECIAL II, 13 & 25mm Ektars, sync AC motor, Mitchell finder, and mounts, 200' magazine, dissolve, good, $1,975. 2 Hasselblad 500 C/M f2.8 Planar, A12 magazine, $2,460 list, brand new/full factory warranty, $1,390 each. SCRANTON PHOTO, Murphy, 322 N. Washington, Scranton, PA 18503 (717) 346-1709.

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35mm NORELCO projector with 4 track mag head, excellent for private room, $1,500. WANTED: Parts for Depue 16/35 reduction printer, lamp house, 16mm gate lens, operation manual. ROBERT M. DOMINIC, 2529 Nordell Ave., Castro Valley, CA 94546. (415) 537-1887.

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ARRIFLEX 16S: 16, 25, 50 matched Schneiders, magazine, torque motor, variable motor, matte box, more, $3,400. 16mm upright Moviola, three sound, one large picture, $3,200. O'Connor-C head, tripod, $600. (206) 284-7361 evenings.

ARRI 16SR with 2 400 ft. mags, right and left hand grips, 2 batteries & chargers, choice of lenses. M. Schlansky, GENERAL CAMERA CORP., 471 11th Ave., NY 10018, (212) 594-8700.

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FOX STUDIO 35mm cameras with crystal sync, prime and anamorphic lenses. For rent or purchase. No. 1820, AMERICAN CINEMATOGRAPHER, (213) 662-4507, 463-5903.

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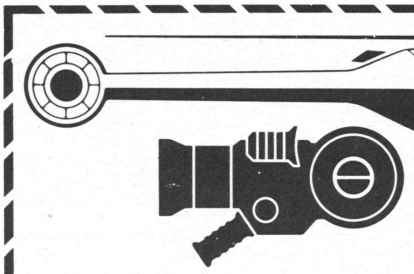

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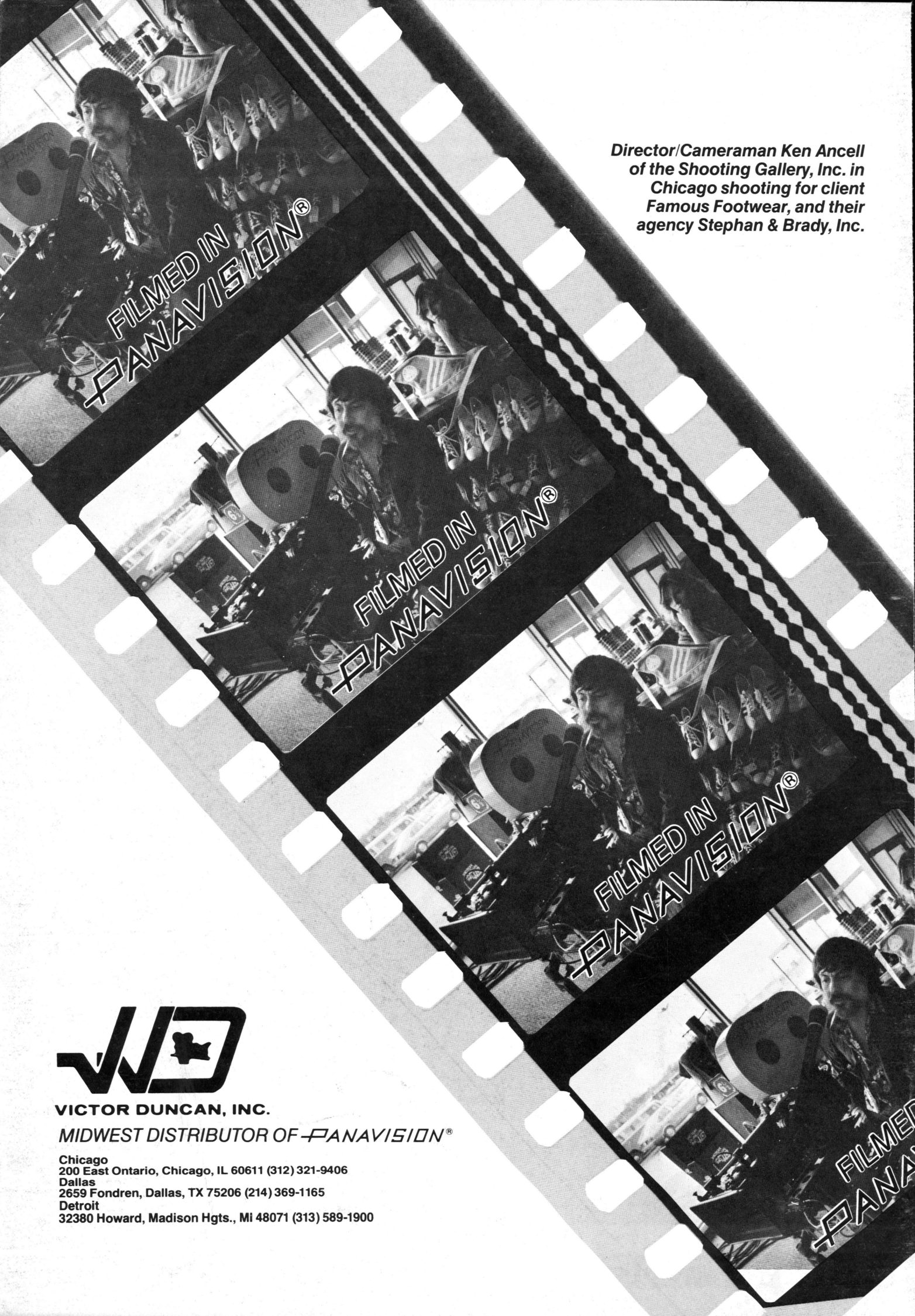

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